# JOURNAL OF CYCLE RESEARCH

Vol. 10, No. 2

April 1961

# JOURNAL OF CYCLE RESEARCH

Vol. 10, No. 2 April 1961

## Contents



*Journal of Cycle Research* is published quarterly in January, April, July, and October of each year by the Foundation for the Study of Cycles at East Brady, Pennsylvania. The subscription rate is $4.00 a year. Single copies are $1.00 each. Entered as second class matter at the post office at East Brady, Pennsylvania with additional entry at Dexter, Michigan. Publication office, 680 West End Avenue, New York 25, New York

# EDITORIAL

# CYCLE STUDY, GENERAL AND SPECIFIC

## General

All cycle study should start with the assumption that the observed rhythm is the result of chance. This assumption does not mean that the successive *waves* are the result of chance. It does mean that the tendency of these successive waves to recur at reasonably regular time intervals should be considered as accidental until they prove themselves to be otherwise.

Any person who has studied random numbers, or random numbers smoothed (and hence serially correlated) by means of moving averages, and who has discovered how easily rhythmic cycles can be found in such numbers, will have no difficulty in accepting what should be the basic assumption of cycle analysis.

Only if the rhythm has persisted so regularly and so many times that it cannot reasonably be the result of chance are we warranted in attaching significance to it.

Suppose that in some particular instance the rhythm has repeated enough times and with enough regularity so that it can be considered significant. In this event the assumption should be made that the rhythm is the result of forces inherent within the system involved—that the cause is endogenous. If the phenomenon is economic the assumption should be that the cause is economic. If the phenomenon is biologic the assumption should be that the cause is biologic, or at least ecological. And so on.

Only in those instances where neither chance nor an endogenous cause are sufficient to explain the behavior, are we justified in assuming that the cause of the cycle is external to the system involved—i.e., that the cause is exogenous.

The exogenous cause of a rhythmic cycle might lie within the field of another discipline—for example rhythmic cycles in weather might affect business or prices. Or it might consist of environmental forces not now known to exist.

The *raison d'être* of cycle study as such is the assumption that there *may* be, in certain instances, exogenous cycle relationships. If there are, there is much greater chance of noticing them as a result of cycle study that transcends the boundaries of the separate disciplines. If there is, let us say, a 2-year cycle in weather that creates a corresponding 2-year cycle in business, the presence of the business cycle is not likely to be known to the climatologist; nor vice versa. The discovery of an exogenous cause is even more likely to be missed if the external force is not even known.

Admittedly, the discovery of forces not now known to science is highly improbable. Yet, if such forces exist, how could we know of them except through their effects? How can we know of *any* force, for that matter, except through its effect? Are not the magnetic "lines of force" merely postulations to explain the behavior of the compass? And if there are forces of long wave lengths acting upon human beings in the mass, how could we learn of such behavior until we had records extending over a period of time long enough to encompass enough repetition of the cycle to demonstrate their validity? Only now have we reached this state in human affairs. Even yet, statistical records of more than 100 years in duration are a rarity.

Not only, *a priori*, is the discovery of rhythmic forces not now known to science highly improbably, but any theory relative to such forces has hard sledding. Ignore for the moment what these forces are, how they could originate, how they could be transmitted, how they could affect terrestrial affairs. Just make the raw unsupported assumption that such forces exist, coming let us assume from the sun, the planets, the galaxy, or from outer space. Let us think of these forces as ultra long energy waves.

The first difficulty we run into (in addition to those already named) is the fact that if there were such waves they would be so weak that they would be unable to effect any chemical or electronic change whatsoever, in human brains or otherwise. We would then have to say that life and emotion can be affected

directly by such forces. This of course might be so, but in that event we would have to rule out any concomitant effect on the weather or any nonliving phenomena.

One way around this difficulty would be to suppose, not ultra long waves, but ordinary short waves that are more frequent at one time than at another. Such short waves are known. Moreover, they do come more frequently at one time than at another—in rhythmic cycles, incidentally—but there is no evidence that I know of to suggest wave lengths in terrestrial affairs corresponding to the cycles observed, or vice versa.

Pass lightly over these objections. Assume that "somehow" there are such forces external to the earth, or at least to the phenomena on the surface of the earth. There would have to be many such forces because many wave lengths have been observed. This brings us to another difficulty. Why is it that some of these phenomena "respond" to one of these wave lengths, other phenomena "respond" to other wave lengths, and still other phenomena "respond" to several wave lengths simultaneously? For instance, why is it that Atlantic salmon in Canada and at Wye in England "respond" to a 9.6-year force; red foxes in Canada to an 8-year force; Canadian lynx to both 9.6-*and* 8-year forces? You might answer, one is a fish, one is a fox, and one a lynx. Very good. But why is it that the people who, in the mass, dictate the volume of residential building construction "respond" to a cycle just short of 33 months, whereas the people who, in the mass, dictate the fluctuation of non-acetate rayon deliveries "respond" to a cycle just a shade over 24 months? Here all those who "respond" are human beings!

And finally, how is it that the same cycle seems to crest later and later as found from either pole toward the equator?

To summarize: There are no known causes that could produce rhythmic cycles, no known mechanisms by which the unknown causes (if they exist) could operate, and no known reason why the unknown causes (if they exist) operating through the unknown mechanisms (if they exist) should affect various phenomena selectively, by kind of animal, by latitude, and, in the case of human beings, by kind of activity!

Assuming then that the case of cycles forced by mysterious external forces is dead (but we shall see later that it will not die), what is the residual use of cycle study as such: The answer is fourfold:

First, it can devise better methods for the detection, isolation and evaluation of rhythms. More particularly it can devise methods by means of which significant and random fluctuations can more readily be distinguished from each other. It can apply these methods to the various known fluctuations. It can thus separate those fluctuations that need to be explained from those that may safely be ignored —at all events for the time being.

The matter of adequate statistical tests of significance is a vital matter from the standpoint of cycle study as such. We need tests that will indicate the degree of significance that could be attached to any observed rhythm. This is not an easy thing to do.

There is more to it than this. There is perhaps a hundredfold difference in the significance of rhythms that come true after discovery as compared with rhythms discovered merely in past data. And from the standpoint of cycle study as such, there is additional significance if identical rhythms are discovered in different disciplines—particularly in obviously *unrelated* disciplines. All of these variables need to be evaluated statistically.

This, however, is not the place to go into detail in regard to the requirements of such tests. Let it be assumed that such tests have been developed—if rigorous mathematical ones, are impossible, at least tests of practical usefulness. The next thing to do is to apply them to the various alleged rhythms in order to separate wheat from chaff.

Second, if the results of the work are properly published, it can call attention to non-chance rhythms within a single discipline, if there are such, and thus stimulate the workers in that field to discover (or invent) explanations.

Third, it can call attention to identical rhythms in different disciplines, and thus to possible interdisciplinary correspondences that would not otherwise be noticed.

Fourth, by merely recording examples of rhythm, it can provide the basis whereby later students can more easily separate the significant from the chance variations. The acid test for any rhythm is its ability to presist after discovery (or in prior data). Speaking by and large, if a cycle fades out after discovery, it is probably the result of chance; if it persists after discovery it is probably significant. Obviously, for this test to be applied, the cycle must first be discovered and recorded.

It thus appears that cycle study, soundly conceived and soundly conducted, does have value even if no mysterious hidden forces are discovered. Such study can discover and record instances of rhythmic fluctuation in all fields of natural and social science so that future workers can more easily determine which are meaningful and which are not, develop better tests to evaluate the statistical significance of rhythm, discover and point out identity of rhythm in separate (but related) disciplines,

and evaluate the various rhythms and call the attention of workers in the various fields to significant—i.e., non-chance—rhythms that require explanations.

Granted the usefulness and desirability of such a program, some practical difficulties arise. Where is the money to come from to carry it out? Surely not from a university, probably not from a foundation or the government, certainly not from the general public. If we ignore this hurdle and assume ample funds, still another difficulty presents itself; where can we find the manpower to carry it out? Some young statistian could doubtless be engaged to work on the problem of significance. But without independent means or the assurance of a lifetime income, where is the man of parts, trained in some particular field—economics let us say, or biology, or climatology—who would throw over his career to study rhythmic cycles in wildlife, in weather, in lake levels, in business, and in earthquakes?

All of this brings us back full circle to the notion that I said would not die—namely the idea that some of the rhythms we observe are neither chance nor endogenous, but result from mysterious external forces awaiting discovery. Having been so convincingly killed, why will the idea not go and decently bury itself? There are several reasons:

(1) How could an *endogenous* rhythm reassert itself after a major distortion *in step with its old pattern*? Stop a pendulum clock. Start it again. The new ticktocks will have the same period (wave length) as the old, but it is most unlikely that they will be in phase—in step—with the original beat. Yet rhythmic cycles do revert to the old phase after distortion or even after complete abolition. Many examples can be given. Unless the reversion to the old timing comes about merely by chance, the rhythm would seem to have an external counterpart with which it again gets in step.

(2) How can a purely endogenous rhythm persist over a really long period of time? Take as an example the 16 2/3-year rhythm in wrought iron prices in England from 1277 to date. How could an internal pattern of over and under supply (and/or demand), formed in the days of agricultural England, persist through the changing conditions of the industrial revolution, world trade, and modern methods of communications and finance? But the pattern does persist. This fact is hard to explain unless there is an external force—a metronome—to which these prices respond.

(3) It is conceivable, for example, that weather could affect business. But it is utter nonsense to assume that lynx abundance in Canada could affect business or any aspect of business, or vice versa. The fact that lynx and certain aspects of business both fluctuate in a rhythm of exactly the same wave length suggests an external force common to both. Many other examples could be given.

(4) It is even harder to explain why the respective waves *synchronize*. This tendency of cycles of the same wave length to crest at approximately the same time could, in one or two instances, be the result of chance, but why is it that this behavior is *universal*? Does this correspondence of timing suggest underlying forces to which the separate behavior respond? If not, what does it suggest?

(5) As I said above, one can imagine that weather might influence business, but if so, would you not expect the *overall* temperature or rainfall, or barometric pressure, or what not, to do the influencing? Why would you find a particular rhythm, minor for each, to be present in both, unless in both instances the rhythms were the result of a common cause? If there is a common cause, what could this cause be?

(6) Unless rhythms of the same wave length are caused by an external force, why would they show geographical patterns?

(7) If rhythms were endogenous, we would expect wave lengths to scatter more or less uniformly over the entire spectrum. They do not. They bunch at certain particular periods (wave lengths). They would not be likely to do this if they were unrelated.

(8) The particular wave lengths that we find are often simple multiples or fractions of other wave lengths, or at least seem to be. This characteristic of rhythm would be rare if each wave length were separately generated.

Well then, even if (i) cause, and (ii) mechanism and (iii) the reasons for selectivity, are unknown, why bother about such matters for the moment? Why not simply postulate a Z factor—i.e., external rhythmic forces of a variety of wave lengths—and let it go at that? There are difficulties, as we shall see in a moment, but let us do it anyway.

The credibility of the Z factor depends upon a number of elements, suggested above, but not fully set out. Our postulated Z factor becomes credible only if we can answer "yes" to the following questions:

1. Are our observed rhythms—the building blocks of our theory—statistically significant?

2. Do these non-chance rhythms revert to the old timing after distortion?

3. Are those rhythms that seem to be of the same wave length (particularly when the phenomena are obviously unrelated) really of the same wave length—within the limits of our power to measure?

4. Do the non-chance rhythms of the same

wave length really evidence geographical patterns?

5. Is there really a concentration of wave length?

6. Do the non-chance rhythms of the same wave length have a concentration of phase i.e., timing of crests and troughs? (After adjustment for geographical pattern, if such is found to be real.)

After all this has been done, our Z factor hypothesis will have become more tenable, but without some theory as to cause and mechanism it will still not receive acceptance by science.

What could the cause be? If latitudinal passage is a reality, the cause must be something in the last instance associated with conditions here on earth. If latitudinal passage is not a reality, the cause could be inherent in the space in which the earth is bathed.

In either event the ultimate cause would probably be exterior to the earth. Among the possibilities would seem to be the heavenly bodies, galactic forces, or forces from outer space. Galactic forces or forces from outer space would probably have to be merely postulated unless we could in some way get confirmation from the periods of variable stars, or otherwise (there is a hint of this). On the other hand, if the ultimate cause were to lie in the solar system, it should be possible to get associations capable of very exact measure ment. Rhythmic cycles in solar phenomena coming at the same time as rhythmic cycles of corresponding wave length here on earth would add greatly to the credibility of our terrestrial cycles. Planetary associations would be provocative, but in the absence of some explanation as to how they could possibly have terrestrial repurcussions, would be regarded with more skepticism.

The program is basically simple: (i) Show that the observed rhythms cannot reasonably be chance or endogenous, (ii) try to find associated astronomical or other possible causes, (iii) come up with a theory to explain the behavior as a practical matter. The program is simple, but it is a sizable one.

## Specific

As a practical matter and from the standpoint of the Foundation for the Study of Cycles, in any consideration of cycle study we must think of resources.

To proceed in logical order will take much more money than the Foundation has available. To stab more or less in the dark, trying first this and then that, is uncomfortably close to the methods of the old alchemists. If, when you try heating lead with the left hind foot of an ox it does not turn to gold, try again with the right hind foot of a toad. And if this does not work, try something else. Of course you might be lucky and come up with something of value, like the man who, long ago must have discovered gunpowder in this way. But, on the face of it, it is more likely to result in a lot of wasted effort.

What then should be our course of action? To what should we apply our efforts?

The answer may lie in terms of what actually is most likely to attract further money for basic research.

If we are thinking of money, from one of the major foundations, we must have a college affiliation. Perhaps then the question should be put, what research should we conduct *and how should we publish our results,* so as to achieve such an affiliation?

If the Foundation is thinking of money from individuals it should not ignore (i) the practical usefulness of even the limited cycle knowledge that it has and (ii) the appeal that the hope of an important breakthrough holds for all of us.

As a practical matter, the Foundation should think of both sorts of money. It should act accordingly.

More particularly, the results of the Foundation's research should be published initially in the journals of the various disciplines involved so that the workers in those fields will know of it. Such publication would largely eliminate the need for the *Journal of Cycle Research* which could then be discontinued. (Condensations of such papers could be prepared for the Foundations lay members and be published in *Cycles* magazine.)

Naturally, a scientific paper for publication in the journal of a particular discipline will have to concern itself largely with cycles in that particular discipline. Only gradually and/or to a limited extent can the subject matter of papers of this sort be expanded to include references to cycles in other disciplines, even though they have the same wave length and crest and trough at the same time.

However, for the reasons stated above, I do not feel that stabs in the dark should be abandoned. Granted that they are long shots, the fact remains that the cost is relatively small and that the rewards of success would be tremendous. As the results of such research would not fit into the field of any of the ordinary disciplinary journals, the matter of publication (in the absence of the *Journal of Cycle Research*) naturally arises. Perhaps the answer to this problem is the writing and publication of a book.

Edward R. Dewey

# TWO UNFAMILIAR LUNAR CYCLES*

BY HECTOR H. WOLFE

SUMMARY

The original research here reported upon reveals the presence of two heretofore unknown cycles in lunar phenomena. One of these recurs after an interval of 22,650 days (approximately 62 years and 4 days). The second recurs after an interval of 413.31 days (1 year and 48 days).

The 62-year-and-4-day cycle characterizes three separate phenomena as follows: 1) the time relationship between the time of new moon and the time of moon-in-perigee (the time when the moon is nearest the earth), 2) the pattern of irregularity in the sequence of time intervals in which the line of apsides (the major axis of the moon's orbit) makes seven complete rotations about the earth in relation to the vernal equinox, and 3) the path in right ascension made by the moon-in-perigee.

The 413.31 day (1-year-and-48-day) cycle characterizes the rotation of the line of apsides in relation to the earth's radius vector.

These cycles have more than academic interest. First, they enable us to correct errors that may have crept into the published tables of the lunar aspects. Second, they enable us to predict certain aspects of the moon far into the future. Finally, there is a practical necessity for knowing that the moon will be where we think it will be when men go out to meet it.

The nature of the cycles listed above is so complex that the practical usefulness also mentioned is difficult to see. The work has been broken down into two parts to help clarify it. The first part lists the tables and drawings that were developed in the process of the work and discusses what they mean. The second part is a detailed exposition of the work.

## The Tables and the Drawings

*Table 1: The Time Relationship Between the Time of New Moon and the Time of Moon-in-Perigee.*

The moon is new when it is in line between the earth and the sun. The term "moon-in-perigee" perhaps needs a word of explanation. The moon revolves around the earth in an elliptical orbit with the earth at one of the two foci as shown in Drawing 1. The point in this orbit that is nearest the earth is known as the perigee of the orbit. It is a theoretical point. However once in every revolution the moon passes through this point. At this instant the moon is in perigee. Thus "moon-in-perigee" means the time when the moon is nearest the earth.

The time interval between the new moon and the moon-in-perigee varies from zero to some-

thing over 28 days. The sequence of the various time intervals makes an irregular pattern that repeats every 22,650 days (62 years and 4 days to 62 years and 6 days, depending upon the number of leap years in the cycle).

This repetition has practical application to life because the moon may be looked upon as a power factor, wielding a power that increases and decreases as the distance between the earth and the moon becomes less or greater. Its power value is greatest when the moon is in perigee. Conversely, its power value is least when the moon is in apogee (farthest from the earth). Then too, when the moon is new its value as a power factor augments that of the sun, for the two bodies are then acting in unison to draw upon the earth. Consequently, if the moon were in perigee and in the new simultaneously, the power factor acting upon the earth would be at a maximum.

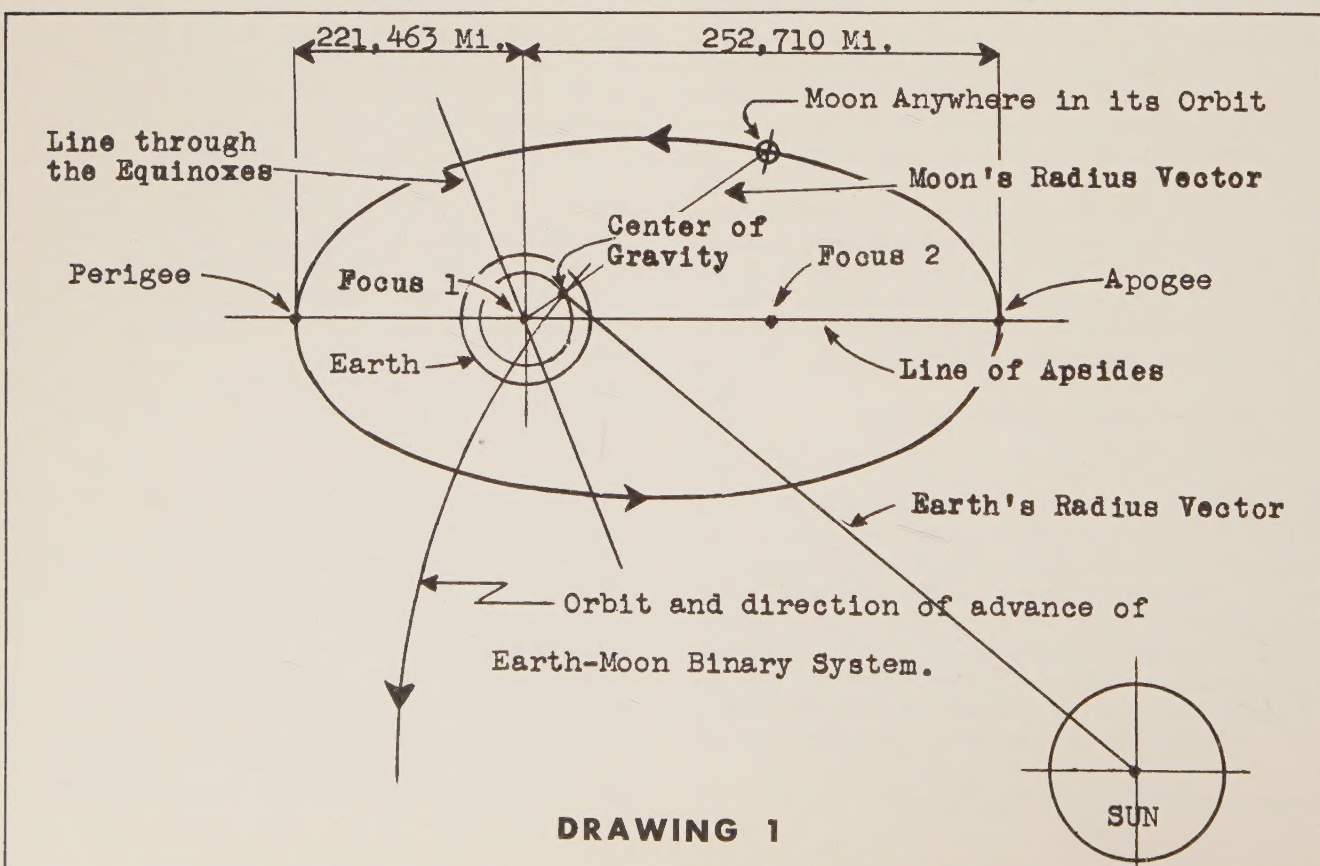
*Drawing 2:* Detail D of Drawing 2 relates to this same cyclic phenomenon.

*Table 3: The Pattern of Irregularity in the Sequence of Time Intervals in Which the Line of Apsides Makes Seven Complete Rotations about the Earth in Relation to the Vernal Equinox.*

The line of apsides is the major axis of the moon's orbit. See Drawing 1. It rotates about the earth in relation to a line through the equinoxes. The time required for this rotation varies in a pattern of irregularity that repeats cyclicly at 62 years and 4 days—the same interval discussed in the preceding section.

Data relative to two consecutive cycles of seven rotations each are shown in Table 3. The rotations occur in varying times, but after seven rotations the pattern of oddity in rotation time is repeated. The oscillatory motion in right ascension of the line of apsides must be taken into account when accurate knowledge of the exact position of the moon is needed at some future time for practical purposes. The *Nautical Almanacs* show the longitude of the perigee as an angular value that increases *constantly* in a counterclockwise direction. But it would seem that when the moon is in perigee, the perigee is where the moon is. A knowledge of this cycle helps us to know with certainty where the moon will be, in certain of its aspects, at any time in the future. This is now a matter of practical importance.

*Drawing 3:* Details E, F, and G of Drawing 3 show and explain one complete rotation of the line of apsides in relation to the line through the equinoxes. In these drawings, the moon is always shown in perigee, and the numer-




**DRAWING 1**

als that appear above the individual lunar orbits in Details E, F, and G are the dates when the moon was in perigee. The first entry on the 1951 line through the equinoxes is 1-06-13, and means 6 January, 1951 at 13 hours. Drawing 3 relates in its entirety to Table 3.

*Drawing 4: The Path in Right Ascension Made by the Moon-in-Perigee Throughout the Cycle.*
Drawing 4 shows the repetition after sixty-two years and four days of the zig-zag path that the moon-in-perigee makes as it travels through the hour circles. The position of the moon in respect of the vernal equinox is indicated in right ascension. So, when the moon is in perigee, the position of the moon-in-perigee in respect of the vernal equinox is indicated in right ascension. This is to imply that when the moon is in perigee, the perigee is in the same right ascension that the moon is.

Right ascension measures the angle between the vernal equinox and the position of any celestial object. The vernal equinox is the time in the spring when the sun is in the plane of the earth's equator. It is one end of the line of intersection of the plane of the earth's equator and the plane of the ecliptic. The succession of positions in right ascension of the moon-in-perigee is repeated, like the two phenomena described above, after 62 years and 4 days, as shown in Drawing No. 4.

The oscillatory nature ofthe movement of the line of apsides is implicit in the to-and-fro movement of the wandering perigee as shown in the paths that it has traipsed through the three three-year periods. The remarkable parallelism that is apparent in the relationship among the three paths made by the traveling moon-in-perigee, shows the cyclic manner in which the sequence of the irregular movements of the perigee recur, both in duration of movement, and in direction.

*Table 2: The 413.31-day (1-year-and-48-days) cycle in the rotation of the line of apsides in relation to the earth's radius vector.*
Table 2 shows 112 rotations of the line of apsides of the moon's orbit about the earth, the earth being considered as the earthly terminus of the earth's radius vector. The cycle characterizes the rotation of the line of apsides in relation to the earth's radius vector. The angle between these two lines has an important bearing upon the oscillation of the line of apsides.

The earth's radius vector is the line from the sun to the center of gravity of the earth-moon binary system. Details relative to 112 successive rotations of the line of apsides around the earth's radius vector are shown in Table 2.

This cycle shows the repetitive nature of the changes in the angular relationship that govern the times when the moon shows a steady direct motion in contrast to the times when it alternates between direct and retrograde motion.

*Drawing 2:* Details A, B, and C present graphically and in detail, one of the cycles that Table 2 includes.

## A Cycle of Sixty-Two Years and Four Days in the New-Moon — Moon-in-Perigee Relationship

TABLE 1 exhibits a cycle that is accomplished in 22,650 days, or a few hours less than sixty-two years and four days. In that period of time the moon has come to the "new" 767 times, and into the point in her orbit where she is nearest the earth, 822 times. (The point in the moon's orbit that lies nearest the earth is called "perigee.") In Table 1 the new moons are numbered consecutively from zero to 767, and the two sixty-two year cycles are presented in parallel.

DRAWING 2, IN DETAIL D, augments the data that Table 1 shows, in a schematic diagram. In it the two cycles run consecutively.

The moon may be looked upon as a power factor, wielding a power that waxes and wanes as the distance between the earth and the moon becomes less or greater. Its power value is greatest when the moon is nearest the earth, which is the time when the moon is said to be in perigee. Conversely, its power value is least when the moon is farthest from the earth; and when the moon is in such position, it is said to be in apogee. Then too, when the moon is new its value as a power factor augments that of the sun, for the two bodies are then acting in unison to draw upon the earth. Consequently, if the moon were in perigee and in the new simultaneously, the power factor acting upon the earth would be at a maximum.

As has been stated, this cycle is completed in sixty-two years and almost four days. After that much time has gone by, the sun-moon power pattern is repeated with remarkable similarity. The two cycles comprehended in Table 1 are presented in parallel, with the story of each moon and its replica of sixty-two years later being presented side by side, for easy comparison. Every aspect of life upon earth that is responsive to magnetic or gravitational influences of celestial origin may be affected by the relationship that Table 1 establishes, and a knowledge of the cyclic nature of the variations in the power that that influence wields can be extremely useful.

COLUMN C AND E IN TABLE 1 demonstrate the

re-establishment of the new-moon—moon-in-perigee relationship that existed sixty-two years previously.

Column C shows the time between new moon and the time next thereafter when the moon came to perigee. Column C measures power. That power waxes until the current moon yields to the next new moon.

COLUMN E is the complement to Column C. Together they equal Column F, which is the time from new moon to new moon. The power measure represented in Column E wanes as that in Column C waxes, and vice versa. It shows the time from moon-in-perigee to the next new moon.

COLUMN F shows the time that elapsed between successive new moons. Each entry in Column F is a lunation. Its average length is 29.53059 days, or 29 days, 12 hours, 44 minutes, and 02.9 seconds.

COLUMN A gives the numbers of the new moon in sequence, from zero at the beginning of each of the two cycles, to 767 inclusive.

COLUMN B gives the dates successively upon which the moon became new. The limits of the two cycles comprehended in this study are as follows:

From the new moon of 20 November, 1835, at 10:30 AM,
To...the new moon of 24 November, 1897, at 09:20 AM, and
From the new moon of 24 November, 1897, at 09:20 AM,
To...the new moon of 30 November, 1959, at 08:46 AM.

COLUMN D, where it is not blank, shows an entire period between two successive times when the moon came nearest the earth. A condition arises in such circumstances, in which a lunation contains an entire anomalistic month, and more. It is here that power shifts from moon to moon. (An anomalistic month is the time that the moon takes to go from perigee to perigee.) Each entry in Column D signifies the duration of an anomalistic month that is entirely contained within a lunation. This "double perigee" condition arises fifty-five times within the scope of the sixty-two year cycle, and may be itself a *sub-cycle* of 411.82 days duration. The black spots with dates beside them, situated in Column D, pertain to another matter that is considered later in Table 3.

## A Cycle of One Year and 48 Days in the Rotation of the Line of Apsides in Relation to the Earth's Radius Vector

TABLE 2 shows a succession of cycles, each of which comprehends about 360 degrees of rotation of the major axis of the moon's orbit about the earthly terminus of the earth's radius vector.

A line from the sun to a wandering point variously located somewhere in the interior of the earth is the earth's radius vector. Any of the lines that radiate from the central sun in Details A and B on Drawing 2 performs the function of a radius vector. As the earth swings around the sun in its annual revolution the earth's radius vector swings with it. That annual revolution is accomplished in a counter-clockwise direction, the same direction in which the major axis of the moon's orbit revolves about the earth, once in about eight years, ten months.

ON DRAWING 2, DETAILS A AND B show the positions of the earth's radius vector at the times when the moon came nearest the earth, that is, at the times when the moon came to perigee, in 1958 and 1959. *The angle between the major axis of the moon's orbit and the earth's radius vector changes constantly with the passage of time, as the drawings reveal.*

Between the beginning of the pictured cycle in 1958, and the finish in 1959, the major axis of the moon's orbit had moved through almost 360 degrees of rotation about the earthly terminus of the earth's radius vector. The pictured cycle is typical for all such relative movement. The cycles differ in the time since new moon, to their beginnings. The actual rotation accomplished between the pairs of dates shown in Table 2 is not quite 360 degrees. It averages instead, about 358 1/2 degrees, a measure that is short of coming to full circle by but a few hours of travel of the earth and the moon.

On the same Drawing 2, DETAIL C exhibits the changes in angular relationship between the major axis of the moon's orbit and the earth's radius vector more simply than Details A and B above show the same thing. The exhibited cycle is the last but one in Table 2. That entry in the table shows that the rotation is but two hours short of making full circle. The table commenced with the moon nearly full, and finished at the perigee just past the *new moon*.

COLUMN G shows the time since new moon, to the beginning of each cycle. For instance, the moon was new at 9 April, 1834 at 04:42 AM, and came to perigee 13 days and 5 hours later. Then, to put a limit to the cycle, the moon came to perigee 13 days and 4 hours after the new moon at 27 May, 1835 at 01:32 PM, one hour short of full circle.

COLUMN H shows the dates of the times involved in the cycle determination, when the moon came to perigee. Within the limits of each such cycle, fifteen anomalistic months are included.

COLUMN K shows the days and hours through

which the cycle endures. It is derived by subtracting the earlier date from the later one.

The nomenclature shown at the fourth figure in Detail C on Drawing 2 is standard throughout this work. Wherever any of the terms illustrated there are used, the meaning and function thereof is as indicated.

## A Cycle of 62 Years and 4 Days in the Pattern of the Line of Apsides Relative to the Vernal Equinox

TABLE 3 comprehends two cycles of 22,650 days to each cycle, or sixty-two years and four days to each cycle. The time element is the same as that involved in the presentation of the new-moon—moon-in-perigee relationship shown in Table 1, but the cycle here pertains to the pattern of irregularity in the sequence of time invervals in which the line of apsides (the major axis of the moon's orbit) makes seven complete rotations about the earth in relation to the vernal equinox.

Twice a year the sun is in the plane of the earth's equator, once at about March 21st, and again at about September 21st. When the sun is at these points the days and nights are of equal length. Those points are called the equinoxes. The vernal equinox is so called for the reason that the sun is in that point in the spring, and the other is the autumnal equinox. For the ordinary affairs of life, the vernal equinox is the point of reference in the skies upon which consideration of celestial matters is based. It moves slightly, but the movement is so slight as to be negligible in most of our daily affairs, unless we are astronomers.

The earth always sits upon a line drawn through the two points in the skies that represent the equinoxes. That line is the reference line upon which the data in Table 3, and Drawing 3 are based. The earth may be considered as being a point in that line, with the moon revolving about that point. *The angular change in the relationship between the major axis of the moon's orbit and the line through the equinoxes is the subject of these considerations.* Of particular interest is the time that elapses between two successive occasions when the included angle between the major axis of the moon's orbit and the line through the equinoxes is the same, or nearly so. Between two such occasions this angular relationship moves through 360 degrees, with the moon in perigee, standing at the same distance from the vernal equinox as it was at the commencement of the movement.

Examination of Detail G on Drawing 3 reveals that the last statement requires some elaboration. Detail G shows the gradual change of the moon-in-perigee from its position in right ascension at 17 hours-47 minutes on 6 January, 1951 at 13:00 hours, to its next occupancy of that same position in right ascension, on 29 December, 1959 at 01:00 hours. Between those two dates, the moon-in-perigee has rotated through 358 1/2 degrees of angle in 3,278 1/2 days. It must be noted, however, that the moon-in-perigee started from its position at 17 hours-47 minutes of right ascension on 6 January at 13:00 hours, and moved in a *counterclockwise* direction. But on the next ensuing 2 March at 7:00 hours it was back in nearly the same right ascension from which it started. It had hardly got away from the post before it returned. The moon-in-perigee then started again on its course in a counterclockwise direction, only to come back and start over on 19 June at 14:00 hours, and yet again, its vacillating ways brought it back to nearly the same starting position in right ascension, on 30 November at 13:00 hours. Not until then did the moon-in-perigee get away to run the entire gamut of the hour circles to complete the course. *And, as the moon-in-perigee moves, so moves the line of apsides, unless the movement of the unoccupied perigee of the moon's orbit moves in some fashion that compensates for the oscillations that the occupied perigee manifests.* Because of the way in which the oscillations described above vary, the rotation of the line of apsides through 360 degrees is accomplished in periods of time of varying duration.

Seven such rotations constitute the cycle, two of which are comprehended in Table 3.

COLUMN L shows the calendar limits of fourteen complete rotations, plus a little, or 360.65 degrees of average movement. The prevailing movement of the line of apsides is in a counterclockwise direction, *in spite of the back-tracking.* The time intervals between successive dates are not equal. The phase of the moon at the commencement of the rotation has much to do to fix the time in which the rotation is accomplished. The moon was in perigee—that point in its orbit that lies nearest the earth—at the times indicated in Column L.

COLUMN M shows the position in relation to the vernal equinox of the moon at those times shown in Column L when the moon was in perigee. To illustrate, on 19 December, 1835 at 06:00, the moon was in perigee, at the hour angle 17 hrs-05 min-45 sec of right ascension. In ordinary parlance the moon could be said to be 256 degrees, 26 minutes, 15 seconds past the vernal equinox in a counterclockwise direction. This angle is derived simply by multiplying the value of the hour angle as it is shown in right ascension, by fifteen. Hour angle zero

is at the vernal equinox, and hour angle twelve is at the autumnal equinox. Each hour angle is the equivalent of fifteen degrees of angular measure. All that matters in this study is that the values shown in Column M are nearly the same, by whatever name the unit of measure is called. The sameness of those values, known by any name, shows that the moon was, at each of the indicated times, at about the same angular distance from the vernal equinox. *And since the moon was in perigee at each of those times, the perigee of the moon's orbit must have been there too.* Traveling from 17 hours in right ascension to 17 hours in right ascension implies 360 degrees of travel; so each of the periods embraced by successive dates in Column L represents approximately 360 degrees of travel.

COLUMN P shows time values of two sorts. Under the sub-heading ANOMALISTIC MONTHS the time between successive dates in Column L is expressed in terms of anomalistic months. (An anomalistic month is the time that the moon takes to go from perigee to perigee). Column P also expresses in days and hours the time between successive dates in Column L. The inequalities in the time intervals, due to the change in phase of the moon at the commencement of some of the periods, is made emphatic here.

Drawing 3 relates to Table 3. It illustrates graphically the facts as heretofore shown in Table 3 and commentary thereon. DETAIL E is an example in which the relationship between the line of apsides—that is, the major axis of the moon's orbit—and a line through the equinoxes is displayed. 1951 was chosen to demonstrate Detail E. The angular relationship under investigation is shown at each time in 1951 when the moon came to perigee. The earth, sun, and moon-in-perigee are all shown in Detail E in their proper relationship to each other. (In all of the details on Drawing 3, the horizontal lines through the earth symbols are lines through the equinoxes.) A comparison of the figures for 6 January, 1951 at 13:00 hours and 28 December, 1951 at 23:00 hours shows that the resultant rotation of the line of apsides about the earth is in a counterclockwise direction.

DETAIL F illustrates in general the same movement that is shown piecemeal in Detail E. As in Detail E, the horizontal lines through the earth symbols are lines through the equinoxes. For the purpose of showing the complete rotation period, the records were examined to find when next after having run the gamut of the hour circles, the moon-in-perigee came to the same point in reference to the vernal equinox that it had inhabited on 6 January, 1951, at 13:00 hours. The sought for occasion arose on 29 December, 1959, at 01:00 hours. *At these two times the moon was in perigee, and its position in reference to the vernal equinox was within one and a quarter degrees of angle of being the same on the two occasions.*

These two dates are separate by 119 anomalistic months, or, expressed in days, by 3,278 1/2 days. Detail F shows the relative positions of the earth, sun, and moon-in-perigee at the limits of a complete rotation, together with one frame chosen at random from each of the years that the complete rotation includes. The progress in the rotation of the line of apsides in a counterclockwise direction is obvious, and at the completion of the rotation the two terminal positions of that line show to be in parallel. A rotation has been completed in 119 anomalistic months, or, in 3,278 1/2 days. (119 anomalistic months of 27.55455 days each, equals 3,278.99 days.)

DETAIL G on Drawing 3 portrays the complete rotation that is shown in skeleton in Detail F. The moon is shown in its proper angular distance from the vernal equinox, at each of the times when it came to perigee throughout one complete rotation of the line of apsides about the earth, the earth being considered as a point in a line through the equinoxes. For each year in the sequence there is a horizontal line extending all the way across the drawing, with the number of a year showing at either end, from 1951 to 1959 inclusive. They are lines through the equinoxes, and the earth represents a point in that line, with the moon orbiting around it. Altogether there are 120 positions shown throughout the sequence, with the moon in perigee in all of them. The earth is shown blacked out in nine of the positions, merely to indicate the sketches that appear in Detail F above. They have no other significance.

Drawing 3 shows but *one* of the *seven* rotations that are comprehended in the cycle shown on Table 3. The other rotations differ mainly in the time that is required for their accomplishment. Otherwise, Drawing 3 may be considered as being typical of the other rotations that go to make the cycle. Of interest is the oscillatory movement of the line of apsides in relation to the line through the equinoxes. That movement starts in a counterclockwise direction, then reverses to become clockwise, and so on throughout the entire rotation. The counterclockwise movement prevails, however, and the period ends as shown at the top of Detail F, with the line of apsides making the same angle with the line through the equinoxes at both ends of the sequence. The sequence finishes with the moon in perigee in the same right ascension as at the beginning. The sequence illustrated in Drawing 3 is the rotation defined by the last two lines on Table 3, from 1-06-13, 1951 to 12-29-01, 1959.

This oscillatory motion in right ascension of the line of apsides must be taken into account when accurate knowledge of the exact position of the moon is needed at some future time for practical purposes. The *Nautical Almanacs* show the longitude of the perigee as an angular value that increases *constantly* in a counterclockwise direction, at the rate of 0.111404 degrees per day. The implied regularity of the movement in longitude of the perigee of the moon's orbit must be confusing to anyone who is not up on astronomy, when the oscillatory motion in right ascension comes to mind. It would seem that when the moon is in perigee, the perigee is where the moon is.

Table 3 has a relationship to Table 1. Some of the spaces in Column D in Table 1 show occasional black spots, with dates beside them. The first such markings are at the first, or zero entry in the table. At intervals of something less than nine years the spots and their accompanying dates re-appear. They mark the limits of the rotations defined in Table 3, and the dates that are beside the black dots correspond with the terminal dates shown in Table 3. Those dates are of times when the moon was in perigee, in Table 1, as in Table 3.

## A Cycle of 62 Years and 4 Days in the Path in Right Ascension made by the Moon-in-Perigee

DRAWING 4 does not lie within the scope of Table 3, nor was the story that Table 3 tells the guide that was followed in the development of the graph that is entitled Drawing 4. As it appears, any two dates could be chosen to illustrate the sense of Drawing 4, the only requisite being that they shall be separate by sixty-two years and four days, the length of the cycle about which Table 3 is built. *The drawing illustrates the path that is made in right ascension by the progress of the moon-in-perigee.* The current year was chosen at random, and the records of the right ascension of the moon at the times of moon-in-perigee were examined to find a time when the path of the moon-in-perigee in right ascension was similar to that for 1961. The paths for 1899 and 1837 appeared to be very like that for 1961. Three periods of three years duration each, separated by sixty-two years and four days, were selected to illustrate the repetitive pattern. Drawing 4 shows them.

The oscillatory nature of the movement of the line of apsides is implicit in the to-and-fro movement of the wandering perigee as shown in the paths that it has traipsed through the three three-year periods. The remarkable parallelism that is apparent in the relationship among the three paths made by the traveling moon-in-perigee, shows the cyclic manner in which the sequence of the irregular movements of the perigee recur, both in duration of movement, and in direction. A cycle published in an earlier *Journal* showed the repetition of the pattern of irregularity in the duration of the anomalistic months within a series of such months extending through thirty-one years.

Although Drawing 4 does not show patterns of thirty-one years apart, such patterns, if they were shown, would exhibit parallelism in the degree that the patterns show that are sixty-two years apart. The one important departure from Drawing 4 that a curve at thirty-one years interval would show, would be that the starting point of the curve in right ascension would be diffirent, by twelve hours of right ascension. For instance, the starting points of the curves shown in the drawing lie between fifteen and sixteen hours of right ascension, and the starting points for similar curves for the years half-way between the ones shown would lie between three and four hours of right ascension. So the moon-in-perigee, starting at any point in right ascension that it can reach, weaves a tangled path through the skies for each sixty-two years and four days; and then, starting from the same scratch, proceeds to follow again the same zig-zag way that was laid in the sky many ages ago by the powers that passed the laws of gravity.

---

## REFERENCES

*The American Ephemeris and Nautical Almanac*, published by the Nautical Almanac Office of the United States Naval Observatory.

*The Nautical Almanac and Astronomical Ephemeris*, published by the Nautical Almanac Office of Great Britain.

# TABLE 1

* * * * * * * *

SHOWING THE TIME RELATIONSHIP THAT EXISTS BETWEEN INFERIOR SYZYGY AND PERIGEE THROUGHOUT TWO CYCLES OF 767 LUNATIONS EACH, OR SLIGHTLY LESS THAN 22650 DAYS EACH CYCLE.

* * * * * * * *

COLUMN A...CARDINAL NUMBERS OF THE NEW MOONS IN SEQUENCE.

COLUMN B...DATES OF OCCURRENCE OF INFERIOR SYZYGY.

COLUMN C...TIME INTERVALS BETWEEN INFERIOR SYZYGY AND PERIGEE.

COLUMN D...TIME INTERVALS BETWEEN PERIGEE AND THE OCCASIONAL SECOND PERIGEE WITHIN A LUNATION.

COLUMN E...TIME INTERVALS BETWEEN THE LATEST PERIGEE WITHIN A LUNATION AND THE NEXT INFERIOR SYZYGY.

COLUMN F...DURATION OF LUNATIONS.

* * * * * * * *

| COLUMN A | COLUMN B | COLUMN C | COLUMN D | COLUMN E | COLUMN F |
|---|---|---|---|---|---|
| NUMBER | YEAR-MO-DA-HR-MIN | DAS-HRS-MIN | DAS-HRS | DAS-HRS-MIN | DAS-HRS-MIN |
| 0 * | 1835-11-20-10-30 | 00- 07- 30 | 28-12 (1835-12-19-06) | 00- 15- 14 | 29- 10- 44 |
| 0.* | 1897-11-24-09-20 | 00- 04- 40 | 28-13 (1897-12-23-03) | 00- 16- 55 | 29- 10- 35 |
| 1 | 1835-12-19-21-14 | 27- 17- 46 | | 01- 17- 28 | 29- 11- 14 |
| 1 | 1897-12-23-19-55 | 27- 17- 05 | | 01- 18- 25 | 29- 11- 30 |
| 2 | 1836- 1-18-08-28 | 26- 04- 32 | | 03- 07- 18 | 29- 11- 50 |
| 2 | 1898- 1-22-07-25 | 25- 23- 35 | | 03- 12- 41 | 29- 12- 16 |
| 3 | 1836- 2-16-20-18 | 22- 08- 42 | | 07- 04- 04 | 29- 12- 46 |
| 3 | 1898- 2-20-19-41 | 21- 19- 19 | | 07- 17- 37 | 29- 12- 56 |
| 4 | 1836- 3-17-09-04 | 18- 16- 56 | | 10- 21- 03 | 29- 13- 59 |
| 4 | 1898- 3-22-08-37 | 18- 13- 23 | | 11- 00- 21 | 29- 13- 44 |
| 5 | 1836- 4-15-23-03 | 16- 23- 57 | | 12- 15- 07 | 29- 15- 04 |
| 5 | 1898- 4-20-22-21 | 16- 22- 39 | | 12- 15- 58 | 29- 14- 37 |
| 6 | 1836- 5-15-14-07 | 15- 16- 53 | | 13- 22- 37 | 29- 15- 30 |
| 6 | 1898- 5-20-12-58 | 15- 15- 02 | | 14- 00- 19 | 29- 15- 21 |
| 7 | 1836- 6-14-05-37 | 14- 11- 23 | | 15- 03- 49 | 29- 15- 12 |
| 7 | 1898- 6-19-04-19 | 14- 09- 41 | | 15- 05- 47 | 29- 15- 28 |
| 8 | 1836- 7-13-20-49 | 13- 04- 11 | | 16- 10- 12 | 29- 14- 23 |
| 8 | 1898- 7-18-19-47 | 13- 03- 13 | | 16- 11- 34 | 29- 14- 47 |
| 9 | 1836- 8-12-11-12 | 11- 17- 48 | | 17- 19- 43 | 29- 13- 31 |
| 9 | 1898- 8-17-10-34 | 11- 14- 26 | | 17- 23- 10 | 29- 13- 36 |
| 10 | 1836- 9-11-00-43 | 09- 07- 17 | | 20- 05- 29 | 29- 12- 46 |
| 10 | 1898- 9-16-00-10 | 09- 04- 50 | | 20- 07- 37 | 29- 12- 27 |
| 11 | 1836-10-10-13-29 | 04- 14- 31 | | 24- 21- 34 | 29- 12- 05 |
| 11 | 1898-10-15-12-37 | 04- 13- 23 | | 24- 22- 20 | 29- 11- 43 |
| 12 | 1836-11-09-01-34 | 02- 09- 26 | | 27- 02- 00 | 29- 11- 26 |
| 12 | 1898-11-14-00-20 | 02- 07- 40 | | 27- 03- 43 | 29- 11- 23 |
| 13.* | 1836-12-08-13-00 | 01- 03- 00 | | 28- 07- 46 | 29- 10- 46 |
| 13.* | 1898-12-13-11-43 | 01- 01- 17 | | 28- 09- 50 | 29- 11- 07 |
| 14 | 1837- 1-06-23-46 | 00- 04- 14 | 28-12 | 00- 18- 08 | 29- 10- 22 |
| 14 | 1899- 1-11-22-50 | 00- 03- 10 | 28-12 | 00- 19- 32 | 29- 10- 42 |
| 15 | 1837- 2-05-10-08 | 27- 13- 52 | | 01- 20- 29 | (29- 10- 21) |
| 15 | 1899- 2-10-09-32 | 27- 12- 28 | | 01- 21- 53 | (29- 10- 21) |
| 16 | 1837- 3-06-20-29 | 25- 22- 31 | | 03- 12- 20 | 29- 10- 51 |
| 16 | 1899- 3-11-19-53 | 25- 17- 07 | | 03- 17- 21 | 29- 10- 28 |
| 17 | 1837- 4-05-07-20 | 22- 00- 40 | | 07- 11- 02 | 29- 11- 42 |
| 17 | 1899- 4-10-06-21 | 21- 14- 39 | | 07- 20- 39 | 29- 11- 18 |
| 18 | 1837- 5-04-19-02 | 18- 15- 58 | | 10- 20- 44 | 29- 12- 42 |
| 18 | 1899- 5-09-17-39 | 18- 13- 21 | | 10- 23- 20 | 29- 12- 41 |
| 19 | 1837- 6-03-07-44 | 17- 00- 16 | | 12- 13- 30 | 29- 13- 46 |
| 19 | 1899- 6-08-06-20 | 16- 22- 40 | | 12- 15- 31 | 29- 14- 11 |
| 20 | 1837- 7-02-21-30 | 15- 17- 30 | | 13- 21- 20 | 29- 14- 50 |
| 20 | 1899- 7-07-20-31 | 15- 15- 29 | | 13- 23- 48 | 29- 15- 17 |
| 21 | 1837- 8-01-12-20 | 14- 12- 40 | | 15- 03- 00 | 29- 15- 40 |
| 21 | 1899- 8-06-11-48 | 14- 10- 12 | | 15- 05- 33 | 29- 15- 45 |
| 22 | 1837- 8-31-04-00 | 13- 07- 00 | | 16- 09- 01 | 29- 16- 01 |
| 22 | 1899- 9-05-03-33 | 13- 03- 27 | | 16- 12- 14 | 29- 15- 41 |
| 23 | 1837- 9-29-20-01 | 11- 17- 59 | | 17- 21- 33 | 29- 15- 32 |
| 23 | 1899-10-04-19-14 | 11- 14- 46 | | 18- 00- 27 | 29- 15- 13 |
| 24 | 1837-10-29-11-33 | 09- 05- 27 | | 20- 08- 50 | 29- 14- 17 |
| 24 | 1899-11-03-10-27 | 09- 01- 33 | | 20- 12- 48 | 29- 14- 21 |
| 25 | 1837-11-28-01-50 | 04- 08- 10 | | 25- 04- 33 | 29- 12- 43 |
| 25 | 1899-12-03-00-48 | 04- 05- 12 | | 25- 07- 52 | 29- 13- 04 |
| 26 * | 1837-12-27-14-33 | 02- 05- 27 | | 27- 05- 52 | 29- 11- 19 |
| 26.* | 1900- 1-01-13-52 | 02- 03- 08 | | 27- 08- 23 | 29- 11- 31 |
| 27 | 1838- 1-26-01-52 | 01- 00- 08 | | 28- 10- 08 | 29- 10- 16 |
| 27 | 1900- 1-31-01-23 | 00- 22- 37 | | 28- 11- 25 | 29- 10- 02 |
| 28 | 1838- 2-24-12-08 | 00- 00- 52 | 28-12 | 00- 20- 45 | 29- 09- 37 |
| 28 | 1900- 3-01-11-25 | 00- 00- 35 | 28-11 | 00- 21- 31 | 29- 09- 06 |
| 29 | 1838- 3-25-21-45 | 27- 10- 15 | | 01- 23- 01 | 29- 09- 16 |
| 29 | 1900- 3-30-20-31 | 27- 08- 29 | | 02- 00- 23 | 29- 08- 52 |
| 30 | 1838- 4-24-07-01 | 25- 16- 59 | | 03- 16- 23 | 29- 09- 22 |
| 30 | 1900- 4-29-05-23 | 25- 12- 37 | | 03- 20- 50 | 29- 09- 27 |
| 31 | 1838- 5-23-16-23 | 21- 20- 37 | | 07- 13- 34 | 29- 10- 11 |
| 31 | 1900- 5-28-14-50 | 21- 11- 10 | | 07- 23- 27 | 29- 10- 37 |
| 32 | 1838- 6-22-02-34 | 18- 10- 26 | | 11- 01- 22 | 29- 11- 48 |
| 32 | 1900- 6-27-01-27 | 18- 12- 33 | | 10- 23- 43 | 29- 12- 16 |
| 33 | 1838- 7-21-14-22 | 17- 00- 38 | | 12- 13- 26 | 29- 14- 04 |
| 33 | 1900- 7-26-13-43 | 16- 21- 17 | | 12- 16- 53 | 29- 14- 10 |
| 34 | 1838- 8-20-04-26 | 15- 17- 34 | | 13- 22- 45 | 29- 16- 19 |
| 34 | 1900- 8-25-03-53 | 15- 14- 07 | | 14- 01- 57 | 29- 16- 04 |
| 35 | 1838- 9-18-20-45 | 14- 13- 15 | | 15- 04- 25 | 29- 17- 40 |
| 35 | 1900- 9-23-19-57 | 14- 10- 03 | | 15- 07- 27 | 29- 17- 30 |
| 36 | 1838-10-18-14-25 | 13- 05- 35 | | 16- 12- 02 | 29- 17- 37 |
| 36 | 1900-10-23-13-27 | 13- 02- 33 | | 16- 15- 17 | 29- 17- 50 |
| 37 | 1838-11-17-08-02 | 11- 14- 58 | | 18- 01- 23 | 29- 16- 21 |
| 37 | 1900-11-22-07-17 | 11- 12- 43 | | 18- 04- 01 | 29- 16- 44 |
| 38 | 1838-12-17-00-23 | 08- 23- 37 | | 20- 14- 53 | 29- 14- 30 |
| 38 | 1900-12-22-00-01 | 08- 15- 59 | | 20- 22- 36 | 29- 14- 35 |
| 39 * | 1839- 1-15-14-53 | 04- 01- 07 | | 25- 11- 28 | 29- 12- 35 |
| 39.* | 1901- 1-20-14-36 | 03- 21- 24 | | 25- 14- 45 | 29- 12- 09 |
| 40 | 1839- 2-14-03-28 | 02- 00- 32 | | 27- 10- 13 | 29- 10- 45 |
| 40 | 1901- 2-19-02-45 | 02- 00- 15 | | 27- 09- 53 | 29- 10- 08 |
| 41 | 1839- 3-15-14-13 | 00- 20- 47 | 28-11 | 00- 01- 18 | 29- 09- 05 |
| 41 | 1901- 3-20-12-53 | 00- 21- 07 | 28-11 | 00- 00- 37 | 29- 08- 44 |
| 42 | 1839- 4-13-23-18 | 28- 09- 42 | | 00- 22- 10 | 29- 07- 52 |
| 42 | 1901- 4-18-21-37 | 28- 08- 23 | | 00- 23- 38 | 29- 08- 01 |
| 43 | 1839- 5-13-07-10 | 27- 06- 50 | | 02- 00- 42 | 29- 07- 32 |
| 43 | 1901- 5-18-05-38 | 27- 05- 22 | | 02- 02- 33 | 29- 07- 55 |
| 44 | 1839- 6-11-14-42 | 25- 14- 18 | | 03- 18- 01 | 29- 08- 19 |
| 44 | 1901- 6-16-13-33 | 25- 10- 27 | | 03- 22- 10 | 29- 08- 37 |
| 45 | 1839- 7-10-23-01 | 21- 12- 59 | | 07- 21- 19 | (29- 10- 18) |
| 45 | 1901- 7-15-22-10 | 21- 09- 50 | | 08- 00- 28 | (29- 10- 18) |
| 46 | 1839- 8-09-09-19 | 18- 14- 41 | | 10- 22- 21 | 29- 13- 02 |
| 46 | 1901- 8-14-08-28 | 18- 11- 32 | | 11- 01- 19 | 29- 12- 51 |
| 47 | 1839- 9-07-22-21 | 16- 23- 39 | | 12- 16- 13 | (29- 15- 52) |
| 47 | 1901- 9-12-21-19 | 16- 20- 41 | | 12- 19- 11 | (29- 15- 52) |
| 48 | 1839-10-07-14-13 | 15- 16- 47 | | 14- 01- 11 | 29- 17- 58 |
| 48 | 1901-10-12-13-11 | 15- 13- 49 | | 14- 04- 34 | 29- 18- 23 |
| 49 | 1839-11-06-08-11 | 14- 10- 49 | | 15- 08- 01 | 29- 18- 50 |
| 49 | 1901-11-11-07-34 | 14- 08- 26 | | 15- 10- 53 | 29- 19- 19 |
| 50 | 1839-12-06-03-01 | 13- 03- 59 | | 16- 14- 20 | 29- 18- 19 |
| 50 | 1901-12-11-02-53 | 13- 00- 07 | | 16- 18- 15 | 29- 18- 22 |
| 51 | 1840- 1-04-21-20 | 11- 10- 40 | | 18- 05- 59 | 29- 16- 39 |
| 51 | 1902- 1-09-21-15 | 11- 080 45 | | 18- 07- 22 | 29- 16- 07 |
| 52 * | 1840- 2-03-13-59 | 08- 15- 01 | | 20- 23- 05 | 29- 14- 06 |
| 52.* | 1902- 2-08-13-22 | 08- 04- 38 | | 21- 08- 50 | 29- 13- 28 |
| 53 | 1840- 3-04-04-05 | 03- 20- 55 | | 25- 14- 21 | 29- 11- 16 |
| 53 | 1902- 3-10-02-50 | 03- 18- 10 | | 25- 16- 50 | 29- 11- 00 |

Hector Wolfe 4/61

TABLE 1 CONTINUED

* * * * * * * *

| COLUMN A | COLUMN B | COLUMN C | COLUMN D | COLUMN E | COLUMN F |
|---|---|---|---|---|---|
| NUMBER | YEAR-MO-DA-HR-MIN | DAS-HRS-MIN | DAS-HRS | DAS-HRS-MIN | DAS-HRS-MIN |
| 54 | 1840- 4-02-15-51 | 01- 22- 39 | | 27- 10- 06 | 29- 08- 45 |
| 54 | 1902- 4-08-13-50 | 01- 23- 10 | | 27- 09- 45 | 29- 08- 55 |
| 55 | 1840- 5-02-00-06 | 00- 19- 54 | 28-11 | 00- 00- 15 | 29- 07- 09 |
| 55 | 1902- 5-07-22-45 | 00- 20- 15 | 28-11 | 00- 01- 11 | 29- 07- 26 |
| 56 | 1840- 5-31-07-15 | 28- 08- 45 | | 00- 21- 59 | 29- 06- 44 |
| 56 | 1902- 6-06-06-11 | 28- 07- 49 | | 00- 22- 59 | 29- 06- 48 |
| 57 | 1840- 6-29-13-59 | 27- 08- 01 | | 01- 23- 28 | 29- 07- 29 |
| 57 | 1902- 7-05-12-59 | 27- 05- 01 | | 02- 02- 17 | 29- 07- 18 |
| 58 | 1840- 7-28-21-28 | 25- 14- 32 | | 03- 18- 44 | 29- 09- 16 |
| 58 | 1902- 8-03-20-17 | 25- 11- 43 | | 03- 21- 19 | 29- 09- 02 |
| 59 | 1840- 8-27-06-44 | 21- 01- 16 | | 08- 10- 27 | 29- 11- 43 |
| 59 | 1902- 9-02-05-19 | 21- 07- 41 | | 08- 04- 09 | 29- 11- 50 |
| 60 | 1840- 9-25-18-27 | 15- 12- 33 ?? | | ?? 14- 01- 58 | 29- 14- 31 |
| 60 | 1902-10-01-17-09 | 18- 08- 51 | | 11- 06- 14 | 29- 15- 05 |
| 61 | 1840-10-25-08-58 | 16- 22- 02 | | 12- 19- 12 | 29- 17- 14 |
| 61 | 1902-10-31-08-14 | 16- 18- 46 | | 12- 23- 04 | 29- 17- 50 |
| 62 | 1840-11-24-02-12 | 15- 13- 48 | | 14- 05- 25 | 29- 19- 13 |
| 62 | 1902-11-30-02-04 | 15- 11- 56 | | 14- 07- 25 | 29- 19- 21 |
| 63 | 1840-12-23-21-25 | 14- 07- 35 | | 15- 12- 06 | 29- 19- 41 |
| 63 | 1902-12-29-21-25 | 14- 05- 35 | | 15- 13- 39 | 29- 19- 14 |
| 64 | 1841- 1-22-17-06 | 12- 20- 54 | | 16- 21- 21 | 29- 18- 15 |
| 64 | 1903- 1-28-16-39 | 12- 20- 21 | | 16- 21- 20 | 29- 17- 41 |
| 65 * | 1841- 2-21-11-21 | 11- 04- 39 | | 18- 10- 36 | 29- 15- 15 |
| 65 * | 1903- 2-27-10-20 | 11- 02- 40 | | 18- 12- 26 | 29- 15- 06 |
| 66 | 1841- 3-23-02-36 | 08- 08- 24 | | 21- 03- 32 | 29- 11- 56 |
| 66 | 1903- 3-29-01-26 | 07- 17- 34 | | 21- 18- 31 | 29- 12- 05 |
| 67 | 1841- 4-21-14-32 | 03- 19- 28 | | 25- 13- 44 | 29- 09- 12 |
| 67 | 1903- 4-27-13-31 | 03- 15- 29 | | 25- 17- 50 | 29- 09- 19 |
| 68 | 1841- 5-20-23-44 | 02- 00- 16 | | 27- 07- 15 | 29- 07- 31 |
| 68 | 1903- 5-26-22-50 | 01- 22- 10 | | 27- 09- 11 | 29- 07- 21 |
| 69 | 1841- 6-19-07-15 | 00- 21- 45 | | 28- 09- 13 | 29- 06- 58 |
| 69 | 1903- 6-25-06-11 | 00- 20- 49 | 28-09 | 00- 00- 46 | 29- 06- 35 |
| 70 | 1841- 7-18-14-13 | 00- 00- 47 | 28-10 | 00- 20- 33 | 29- 07- 20 |
| 70 | 1903- 7-24-12-46 | 28- 08- 14 | | 00- 22- 51 | 29- 07- 05 |
| 71 | 1841- 8-16-21-33 | 27- 09- 27 | | 01- 23- 02 | 29- 08- 29 |
| 71 | 1903- 8-22-19-51 | 27- 06- 09 | | 02- 02- 31 | 29- 08- 40 |
| 72 | 1841- 9-15-06-02 | 25- 12- 58 | | 03- 21- 27 | 29- 10- 25 |
| 72 | 1903- 9-21-04-31 | 25- 11- 29 | | 03- 23- 30 | 29- 10- 59 |
| 73 | 1841-10-14-16-27 | 21- 00- 33 | | 08- 12- 30 | 29- 13- 03 |
| 73 | 1903-10-20-15-30 | 20- 22- 30 | | 08- 15- 10 | 29- 13- 40 |
| 74 | 1841-11-13-05-30 | 18- 07- 30 | | 11- 08- 35 | 29- 16- 05 |
| 74 | 1903-11-19-05-10 | 18- 03- 50 | | 11- 12- 26 | 29- 16- 16 |
| 75 | 1841-12-12-21-35 | 16- 17- 25 | | 13- 01- 15 | 29- 18- 40 |
| 75 | 1903-12-18-21-26 | 16- 15- 34 | | 13- 02- 47 | 29- 18- 21 |
| 76 | 1842- 1-11-16-15 | 15- 09- 45 | | 14- 09- 54 | 29- 19- 39 |
| 76 | 1904- 1-17-15-47 | 15- 08- 13 | | 14- 11- 05 | 29- 19- 18 |
| 77 | 1842- 2-10-11-54 | 14- 02- 06 | | 15- 16- 29 | 29- 18- 35 |
| 77 | 1904- 2-16-11-05 | 14- 01- 55 | | 15- 16- 39 | 29- 18- 34 |
| 78 * | 1842- 3-12-06-29 | 12- 16- 31 | | 16- 23- 31 | 29- 16- 02 |
| 78 * | 1904- 3-17-05-39 | 12- 16- 21 | | 16- 23- 53 | 29- 16- 14 |
| 79 | 1842- 4-10-22-31 | 10- 23- 29 | | 18- 13- 38 | 29- 13- 07 |
| 79 | 1904- 4-15-21-53 | 10- 21- 07 | | 18- 15- 58 | 29- 13- 05 |
| 80 | 1842- 5-10-11-38 | 07- 22- 22 | | 21- 12- 14 | 29- 10- 36 |
| 80 | 1904- 5-15-10-58 | 07- 12- 02 | | 21- 22- 11 | 29- 10- 13 |
| 81 | 1842- 6-08-22-14 | 03- 18- 46 | | 25- 14- 01 | 29- 08- 47 |
| 81 | 1904- 6-13-21-11 | 03- 15- 49 | | 25- 16- 27 | 29- 08- 16 |
| 82 | 1842- 7-08-07-01 | 01- 23- 59 | | 27- 07- 45 | 29- 07- 44 |
| 82 | 1904- 7-13-05-27 | 01- 22- 33 | | 27- 08- 58 | 29- 07- 31 |
| 83 | 1842- 8-06-14-45 | 00- 22- 15 | | 28- 09- 15 | 29- 07- 30 |
| 83 | 1904- 8-11-12-58 | 00- 20- 02 | 28-10 | 00- 01- 43 | 29- 07- 45 |
| 84 | 1842- 9-04-22-15 | 00- 00- 45 | 28-11 | 00- 20- 24 | 29- 08- 09 |
| 84 | 1904- 9-09-20-43 | 28- 09- 17 | | 00- 23- 25 | 29- 08- 42 |
| 85 | 1842-10-04-06-24 | 27- 09- 36 | | 02- 00- 08 | 29- 09- 44 |
| 85 | 1904-10-09-05-25 | 27- 06- 35 | | 02- 03- 37 | 29- 10- 12 |
| 86 | 1842-11-02-16-08 | 25- 11- 52 | | 04- 00- 15 | 29- 12- 07 |
| 86 | 1904-11-07-15-37 | 25- 08- 23 | | 04- 03- 46 | 29- 12- 09 |
| 87 | 1842-12-02-04-15 | 20- 17- 45 | | 08- 21- 02 | 29- 14- 47 |
| 87 | 1904-12-07-03-46 | 20- 13- 14 | | 09- 01- 17 | 29- 14- 31 |
| 88 | 1842-12-31-19-02 | 18- 01- 58 | | 11- 15- 01 | 29- 16- 59 |
| 88 | 1905- 1-05-18-17 | 18- 00- 43 | | 11- 16- 06 | 29- 16- 49 |
| 89 | 1843- 1-30-12-01 | 16- 12- 59 | | 13- 05- 03 | 29- 18- 02 |
| 89 | 1905- 2-04-11-06 | 16- 12- 54 | | 13- 05- 19 | 29- 18- 13 |
| 90 | 1843- 3-01-06-03 | 15- 05- 57 | | 14- 11- 49 | 29- 17- 46 |
| 90 | 1905- 3-06-05-19 | 15- 05- 41 | | 14- 12- 23 | 29- 18- 04 |
| 91 * | 1843- 3-30-23-49 | 13- 23- 11 | | 15- 17- 19 | 29- 16- 30 |
| 91 * | 1905- 4-04-23-23 | 13- 22- 37- | | 15- 17- 50 | 29- 16- 27 |
| 92 | 1843- 4-29-16-19 | 12- 13- 41 | | 17- 00- 55 | 29- 14- 36 |
| 92 | 1905- 5-04-15-50 | 12- 13- 10 | | 17- 00- 57 | 29- 14- 07 |
| 93 | 1843- 5-29-06-55 | 10- 22- 05 | | 18- 14- 20 | 29- 12- 25 |
| 93 | 1905- 6-03-05-57 | 10- 19- 03 | | 18- 16- 50 | 29- 11- 53 |
| 94 | 1843- 6-27-19-20 | 07- 18- 40 | | 21- 15- 42 | 29- 10- 22 |
| 94 | 1905- 7-02-17-50 | 07- 11- 10 | | 21- 23- 03 | 29- 10- 13 |
| 95 | 1843- 7-27-05-42 | 03- 17- 18 | | 25- 15- 35 | 29- 08- 53 |
| 95 | 1905- 8-01-04-03 | 03- 15- 57 | | 25- 17- 13 | 29- 09- 10 |
| 96 | 1843- 8-25-14-35 | 02- 00- 25 | | 27- 07- 53 | 29- 08- 18 |
| 96 | 1905- 8-30-13-13 | 01- 21- 47 | | 27- 11- 00 | 29- 08- 47 |
| 97 | 1843- 9-23-22-53 | 00- 22- 07 | | 28- 10- 36 | 29- 08- 43 |
| 97 | 1905- 9-28-22-00 | 00- 19- 00 | 28-12 | 00- 01- 58 | 29- 08- 58 |
| 98 | 1843-10-23-07-36 | 00- 00- 24 | 28-12 | 00- 21- 34 | 29- 09- 58 |
| 98 | 1905-10-28-06-58 | 28- 09- 02 | | 01- 00- 47 | 29- 09- 49 |
| 99 | 1843-11-21-17-34 | 27- 08- 26 | | 02- 03- 09 | 29- 11- 35 |
| 99 | 1905-11-26-16-47 | 27- 05- 13 | | 02- 06- 04 | 29- 11- 17 |
| 100 | 1843-12-21-05-09 | 25- 07- 51 | | 04- 05- 18 | 29- 13- 09 |
| 100 | 1905-12-26-04-04 | 25- 01- 56 | | 04- 11- 09 | 29- 13- 05 |
| 101 | 1844- 1-19-18-18 | 20- 10- 42 | | 09- 03- 46 | 29- 14- 28 |
| 101 | 1906- 1-24-17-09 | 20- 04- 51 | | 09- 09- 57 | 29- 14- 48 |
| 102 | 1844- 2-18-08-46 | 17- 23- 14 | | 11- 16- 17 | 29- 15- 31 |
| 102 | 1906- 2-23-07-57 | 17- 21- 03 | | 11- 18- 52 | 29- 15- 55 |
| 103 | 1844- 3-19-00-17 | 16- 10- 43 | | 13- 05- 32 | (29- 16- 15) |
| 103 | 1906- 3-24-23-52 | 16- 09- 08 | | 13- 07- 07 | (29- 16- 15) |
| 104 * | 1844- 4-17-16-32 | 15- 04- 28 | | 14- 11- 53 | 29- 16- 21 |
| 104 * | 1906- 4-23-16-07 | 15- 02- 53 | | 14- 13- 01 | 29- 15- 54 |
| 105 | 1844- 5-17-08-53 | 13- 22- 07 | | 15- 17- 26 | 29- 15- 33 |
| 105 | 1906- 5-23-08-01 | 13- 20- 59 | | 15- 18- 06 | 29- 15- 05 |
| | | 1844-7-26-11 | | | |
| 106 | 1844- 6-16-00-26 | 12- 13- 34 | | 17- 00- 23 | 29- 13- 57 |
| 106 | 1906- 6-21-23-06 | 12- 11- 54 | | 17- 01- 59 | 29- 13- 53 |
| | | 1906-8-01-07 | | | |
| 107 | 1844- 7-15-14-23 | 10- 20- 37 | | 18- 15- 32 | 29- 12- 09 |
| 107 | 1906- 7-21-12-59 | 10- 18- 01 | | 18- 18- 28 | 29- 12- 29 |
| 108 | 1844- 8-14-02-32 | 07- 12- 28 | | 21- 22- 16 | 29- 10- 44 |
| 108 | 1906- 8-20-01-28 | 07- 08- 32 | | 22- 02- 34 | 29- 11- 06 |
| 109 | 1844- 9-12-13-16 | 03- 14- 44 | | 25- 19- 44 | 29- 10- 08 |
| 109 | 1906- 9-18-12-34 | 03- 11- 26 | | 25- 22- 43 | 29- 10- 09 |
| 110 | 1844-10-11-23-24 | 01- 22- 36 | | 27- 11- 36 | 29- 10- 12 |
| 110 | 1906-10-17-22-43 | 01- 19- 17 | | 27- 14- 37 | 29- 09- 54 |
| 111 | 1844-11-10-09-36 | 00- 20- 24 | 28-12 | 00- 02- 13 | 29- 10- 37 |
| 111 | 1906-11-16-08-37 | 00- 17- 23 | 28-13 | 00- 03- 54 | 29- 10- 17 |
| 112 | 1844-12-09-20-13 | 28- 08- 11 | | 01- 02- 13 | 29- 11- 00 |
| 112 | 1906-12-15-18-54 | 28- 08- 06 | | 01- 02- 57 | 29- 11- 03 |
| 113 | 1845- 1-08-07-13 | 27- 03- 47 | | 02- 07- 35 | 29- 11- 22 |
| 113 | 1907- 1-14-05-57 | 27- 01- 03 | | 02- 10- 43 | 29- 11- 46 |
| 114 | 1845- 2-06-18-35 | 25- 00- 25 | | 04- 11- 36 | 29- 12- 01 |
| 114 | 1907- 2-12-17-43 | 24- 14- 17 | | 04- 22- 05 | 29- 12- 22 |
| 115 | 1845- 3-08-06-36 | 20- 06- 24 | | 09- 06- 40 | 29- 13- 04 |
| 115 | 1907- 3-14-06-05 | 19- 22- 55 | | 09- 14- 06 | 29- 13- 01 |
| 116 | 1845- 4-06-19-40 | 17- 21- 20 | | 11- 16- 58 | 29- 14- 18 |
| 116 | 1907- 4-12-19-06 | 17- 18- 54 | | 11- 18- 59 | 29- 13- 53 |
| 117 * | 1845- 5-06-09-58 | 16- 09- 02 | | 13- 06- 08 | 29- 15- 10 |
| 117 * | 1907- 5-12-08-59 | 16- 08- 01 | | 13- 06- 50 | 29- 14- 51 |
| 118 | 1845- 6-05-01-08 | 15- 03- 52 | | 14- 11- 30 | 29- 15- 22 |
| 118 | 1907- 6-10-23-50 | 15- 02- 10 | | 14- 13- 17 | 29- 15- 27 |
| 119 | 1845- 7-04-16-30 | 13- 22- 30 | | 15- 16- 25 | 29- 14- 55 |
| 119 | 1907- 7-10-15-17 | 13- 20- 43 | | 15- 18- 36 | 29- 15- 19 |
| 120 | 1845- 8-03-07-25 | 12- 14- 35 | | 16- 23- 35 | 29- 14- 10 |
| 120 | 1907- 8-09-06-36 | 12- 12- 24 | | 17- 02- 04 | 29- 14- 28 |
| 121 | 1845- 9-01-21-35 | 10- 20- 25 | | 18- 16- 59 | 29- 13- 24 |
| 121 | 1907- 9-07-21-04 | 10- 17- 56 | | 18- 19- 21 | 29- 13- 17 |
| 122 | 1845-10-01-10-59 | 07- 06- 01 | | 22- 06- 42 | 29- 12- 43 |
| 122 | 1907-10-07-10-21 | 07- 03- 39 | | 22- 08- 39 | 29- 12- 18 |
| 123 | 1845-10-30-23-42 | 03- 09- 18 | | 26- 02- 41 | 29- 11- 59 |
| 123 | 1907-11-05-22-39 | 03- 07- 21 | | 26- 04- 22 | 29- 11- 43 |
| 124 | 1845-11-29-11-41 | 01- 18- 19 | | 27- 16- 53 | 29- 11- 12 |
| 124 | 1907-12-05-10-22 | 01- 16- 38 | | 27- 18- 43 | 29- 11- 21 |
| 125 | 1845-12-28-22-53 | 00- 16- 07 | 28-12 | 00- 06- 23 | 29- 10- 30 |
| 125 | 1908- 1-03-21-43 | 00- 15- 17 | 28-13 | 00- 06- 37 | 29- 10- 54 |

TABLE 1 CONTINUED

* * * * * * * *

| COLUMN A NUMBER | COLUMN B YEAR-MO-DA-HR-MIN | COLUMN C DAS-HRS-MIN | COLUMN D DAS-HRS | COLUMN E DAS-HRS-MIN | COLUMN F DAS-HRS-MIN |
|---|---|---|---|---|---|
| 126 | 1846- 1-27-09-23 | 28- 04- 37 | | 01- 05- 32 | 29- 10- 09 |
| 126 | 1908- 2-02-08-37 | 28- 04- 23 | | 01- 05- 57 | 29- 10- 20 |
| 127 | 1846- 2-25-19-32 | 26- 23- 28 | | 02- 10- 51 | 29- 10- 19 |
| 127 | 1908- 3-02-18-57 | 26- 20- 03 | | 02- 14- 02 | 29- 10- 05 |
| 128 | 1846- 3-27-05-51 | 24- 17- 09 | | 04- 17- 48 | 29- 10- 57 |
| 128 | 1908- 4-01-05-02 | 23- 18- 58 | | 05- 15- 33 | 29- 10- 31 |
| 129 | 1846- 4-25-16-48 | 20- 02- 12 | | 09- 09- 44 | 29- 11- 56 |
| 129 | 1908- 4-30-15-33 | 19- 21- 27 | | 09- 14- 15 | 29- 11- 42 |
| 130 * | 1846- 5-25-04-44 | 17- 20- 16 | | 11- 16- 48 | 29- 13- 04 |
| 130 * | 1908- 5-30-03-15 | 17- 18- 45 | | 11- 18- 32 | 29- 13- 17 |
| 131 | 1846- 6-23-17-48 | 16- 10- 12 | | 13- 04- 03 | 29- 14- 15 |
| 131 | 1908- 6-28-16-32 | 16- 08- 28 | | 13- 06- 17 | 29- 14- 45 |
| 132 | 1846- 7-23-08-03 | 15- 04- 57 | | 14- 10- 25 | 29- 15- 22 |
| 132 | 1908- 7-28-07-17 | 15- 02- 43 | | 14- 12- 59 | 29- 15- 42 |
| 133 | 1846- 8-21-23-25 | 13- 23- 35 | | 15- 16- 34 | 29- 16- 09 |
| 133 | 1908- 8-26-22-59 | 13- 21- 01 | | 15- 18- 59 | 29- 16- 00 |
| 134 | 1846- 9-20-15-34 | 12- 15- 26 | | 17- 00- 44 | 29- 16- 10 |
| 134 | 1908- 9-25-14-59 | 12- 13- 01 | | 17- 02- 47 | 29- 15- 48 |
| 135 | 1846-10-20-07-44 | 10- 20- 16 | | 18- 19- 00 | 29- 15- 16 |
| 135 | 1908-10-25-06-47 | 10- 18- 13 | | 18- 20- 53 | 29- 15- 06 |
| 136 | 1846-11-18-23-00 | 06- 23- 00 | | 22- 14- 42 | 29- 13- 42 |
| 136 | 1908-11-23-21-53 | 06- 17- 07 | | 22- 20- 50 | 29- 13- 57 |
| 137 | 1846-12-18-12-42 | 03- 03- 18 | | 26- 08- 45 | 29- 12- 03 |
| 137 | 1908-12-23-11-50 | 03- 01- 10 | | 26- 11- 12 | 29- 12- 22 |
| 138 | 1847- 1-17-00-45 | 01- 14- 15 | | 27- 20- 26 | 29- 10- 41 |
| 138 | 1909- 1-22-00-12 | 01- 12- 48 | | 27- 21- 52 | 29- 10- 40 |
| 139 | 1847- 2-15-11-26 | 00- 13- 34 | 28-11 | (00- 09- 11) | 29- 09- 45 |
| 139 | 1909- 2-20-10-52 | 00- 12- 08 | 28-12 | (00- 09- 11) | 29- 09- 19 |
| 140 | 1847- 3-16-21-12 | 28- 01- 48 | | 01- 07- 22 | 29- 09- 10 |
| 140 | 1909- 3-21-20-11 | 27- 23- 49 | | 01- 08- 51 | 29- 08- 40 |
| 141 | 1847- 4-15-06-22 | 26- 17- 38 | | 02- 15- 23 | 29- 09- 01 |
| 141 | 1909- 4-20-04-51 | 26- 16- 09 | | 02- 16- 42 | 29- 08- 51, |
| 142 | 1847- 5-14-15-23 | 24- 09- 37 | | 04- 23- 52 | 29- 09- 29 |
| 142 | 1909- 5-19-13-42 | 24- 02- 18 | | 05- 07- 28 | 29- 09- 46 |
| 143 * | 1847- 6-13-00-52 | 20- 00- 08 | | 09- 10- 38 | 29- 10- 46 |
| 143 * | 1909- 6-17-23-28 | 19- 20- 32 | | 09- 14- 45 | 29- 11- 17 |
| 144 | 1847- 7-12-11-38 | 17- 21- 22 | | 11- 15- 28 | 29- 12- 50 |
| 144 | 1909- 7-17-10-45 | 17- 17- 15 | | 11- 19- 55 | 29- 13- 10 |
| 145 | 1847- 8-11-00-28 | 16- 11- 32 | | 13- 03- 47 | 29- 15- 19 |
| 145 | 1909- 8-15-23-55 | 16- 07- 05 | | 13- 08- 09 | 29- 15- 14 |
| 146 | 1847- 9-09-15-47 | 15- 05- 13 | | 14- 12- 07 | 29- 17- 20 |
| 146 | 1909- 9-14-15-09 | 15- 01- 51 | | 14- 15- 13 | 29- 17- 04 |
| 147 | 1847-10-09-09-07 | 13- 22- 53 | | 15- 19- 11 | 29- 18- 04 |
| 147 | 1909-10-14-08-13 | 13- 20- 47 | | 15- 21- 18 | 29- 18- 05 |
| 148 | 1847-11-08-03-11 | 12- 13- 49 | | 17- 03- 31 | 29- 17- 20 |
| 148 | 1909-11-13-02-18 | 12- 11- 42 | | 17- 05- 59 | 29- 17- 41 |
| 149 | 1847-12-07-20-31 | 10- 16- 29 | | 18- 23- 08 | 29- 15- 37 |
| 149 | 1909-12-12-19-59 | 10- 13- 01 | | 19- 02- 51 | 29- 15- 52 |
| 150 | 1848- 1-06-12-08 | 06- 13- 52 | | 22- 23- 42 | 29- 13- 34 |
| 150 | 1910- 1-11-11-51 | 06- 02- 09 | | 23- 11- 13 | 29- 13- 22 |
| 151 | 1848- 2-05-01-42 | 02- 23- 18 | | 26- 12- 17 | 29- 11- 35 |
| 151 | 1910- 2-10-01-13 | 02- 20- 47 | | 26- 14- 12 | 29- 10- 59 |
| 152 | 1848- 3-05-13-17 | 01- 11- 43 | | 27- 22- 01 | 29- 09- 44 |
| 152 | 1910- 3-11-12-12 | 01- 10- 48 | | 27- 22- 25 | 29- 09- 13 |
| 153 | 1848- 4-03-23-01 | 00- 10- 59 | 28-11 | 00- 10- 15 | 29- 08- 14 |
| 153 | 1910- 4-09-21-25 | 00- 11- 35 | 28-10 | 00- 10- 33 | 29- 08- 08 |
| 154 | 1848- 5-03-07-15 | 27- 22- 45 | | 01- 08- 40 | 29- 07- 25 |
| 154 | 1910- 5-09-05-33 | 27- 22- 27 | | 01- 09- 16 | 29- 07- 43 |
| 155 | 1848- 6-01-14-40 | 26- 16- 20 | | 02- 15- 19 | 29- 07- 39 |
| 155 | 1910- 6-07-13-16 | 26- 13- 44 | | 02- 18- 20 | 29- 08- 04 |
| 156 * | 1848- 6-30-22-19 | 24- 06- 41 | | 05- 02- 25 | 29- 09- 06 |
| 156 * | 1910- 7-06-21-20 | 24- 00- 40 | | 05- 08- 37 | 29- 09- 17 |
| 157 | 1848- 7-30-07-25 | 19- 22- 35 | | 09- 13- 01 | 29- 11- 36 |
| 157 | 1910- 8-05-06-37 | 19- 18- 23 | | 09- 17- 06 | 29- 11- 29 |
| 158 | 1848- 8-28-19-01 | 17- 19- 59 | | 11- 18- 35 | 29- 14- 34 |
| 158 | 1910- 9-03-18-06 | 17- 15- 54 | | 11- 22- 32 | 29- 14- 26 |
| 159 | 1848- 9-27-09-35 | 16- 09- 25 | | 13- 07- 46 | 29- 17- 11 |
| 159 | 1910-10-03-08-32 | 16- 06- 28 | | 13- 10- 56 | 29- 17- 24 |
| 160 | 1848-10-27-02-46 | 15- 03- 14 | | 14- 15- 30 | 29- 18- 44 |
| 160 | 1910-11-02-01-56 | 15- 01- 04 | | 14- 18- 11 | 29- 19- 15 |
| 161 | 1848-11-25-21-30 | 13- 20- 30 | | 15- 22- 22 | 29- 18- 52 |
| 161 | 1910-12-01-21-11 | 13- 18- 49 | | 16- 00- 21 | 29- 19- 10 |
| 162 | 1848-12-25-16-22 | 12- 10- 38 | | 17- 07- 03 | 29- 17- 41 |
| 162 | 1910-12-31-16-21 | 12- 07- 39 | | 17- 09- 45 | 29- 17- 24 |
| 163 | 1849- 1-24-10-03 | 10- 10- 57 | | 19- 04- 30 | 29- 15- 27 |
| 163 | 1911- 1-30-09-45 | 10- 07- 15 | | 19- 07- 31 | 29- 14- 46 |
| 164 | 1849- 2-23-01-30 | 06- 03- 30 | | 23- 09- 06 | 29- 12- 36 |
| 164 | 1911- 3-01-00-31 | 05- 16- 29 | | 23- 19- 38 | 29- 12- 07 |
| 165 | 1849- 3-24-14-06 | 02- 20- 54 | | 26- 12- 54 | 29- 09- 48 |
| 165 | 1911- 3-30-12-38 | 02- 19- 22 | | 26- 14- 25 | 29- 09- 47 |
| 166 | 1849- 4-22-23-54 | 01- 10- 06 | | 27- 21- 37 | 29- 07- 43 |
| 166 | 1911- 4-28-22-25 | 01- 10- 35 | | 27- 21- 24 | 29- 07- 59 |
| 167 | 1849- 5-22-07-37 | 00- 10- 33 | 28-11 | 00- 09- 19 | 29- 06- 42 |
| 167 | 1911- 5-28-06-24 | 00- 10- 36 | 28-10 | 00- 10- 20 | 29- 06- 56 |
| 168 | 1849- 6-20-14-19 | 27- 23- 41 | | 01- 07- 15 | 29- 06- 56 |
| 168 | 1911- 6-26-13-20 | 27- 21- 40 | | 01- 09- 12 | 29- 06- 52 |
| 169 * | 1849- 7-19-21-15 | 26- 17- 45 | | 02- 14- 33 | 29- 08- 18 |
| 169 * | 1911- 7-25-20-12 | 26- 14- 48 | | 02- 17- 14 | 29- 08- 02 |
| 170 | 1849- 8-18-05-33 | 24- 04- 27 | | 05- 06- 02 | 29- 10- 29 |
| 170 | 1911- 8-24-04-14 | 24- 01- 46 | | 05- 08- 37 | 29- 10- 23 |
| 171 | 1849- 9-16-16-02 | 19- 17- 58 | | 09- 19- 13 | 29- 13- 11 |
| 171 | 1911- 9-22-14-37 | 19- 16- 23 | | 09- 21- 09 | 29- 13- 32 |
| 172 | 1849-10-16-05-13 | 17- 17- 47 | | 11- 22- 13 | 29- 16- 00 |
| 172 | 1911-10-22-04-09 | 17- 13- 51 | | 12- 02- 49 | 29- 16- 40 |
| 173 | 1849-11-14-21-13 | 16- 06- 47 | | 13- 11- 38 | 29- 18- 25 |
| 173 | 1911-11-20-20-49 | 16- 04- 11 | | 13- 14- 40 | 29- 18- 51 |
| 174 | 1849-12-14-15-38 | 15- 00- 22 | | 14- 19- 19 | 29- 19- 41 |
| 174 | 1911-12-20-15-40 | 14- 22- 20 | | 14- 21- 10 | 29- 19- 30 |
| 175 | 1850- 1-13-11-19 | 13- 16- 41 | | 16- 02- 29 | 29- 19- 10 |
| 175 | 1912- 1-19-11-10 | 13- 14- 50 | | 16- 03- 44 | 29- 18- 34 |
| 176 | 1850- 2-12-06-29 | 12- 04- 31 | | 17- 12- 17 | 29- 16- 48 |
| 176 | 1912- 2-18-05-44 | 12- 03- 16 | | 17- 13- 09 | 29- 16- 25 |
| 177 | 1850- 3-13-23-17 | 10- 03- 43 | | 19- 09- 47 | 29- 13- 30 |
| 177 | 1912- 3-18-22-09 | 09- 22- 51 | | 19- 14- 40 | 29- 13- 31 |
| 178 | 1850- 4-12-12-47 | 05- 23- 13 | | 23- 11- 09 | 29- 10- 22 |
| 178 | 1912- 4-17-11-40 | 05- 10- 20 | | 24- 00- 14 | 29- 10- 34 |
| 179 | 1850- 5-11-23-09 | 02- 20- 51 | | 26- 11- 20 | 29- 08- 11 |
| 179 | 1912- 5-16-22-14 | 02- 18- 46 | | 26- 13- 24 | 29- 08- 10 |
| 180 | 1850- 6-10-07-20 | 01- 11- 40 | | 27- 19- 27 | (29- 07- 07) |
| 180 | 1912- 6-15-06-24 | 01- 10- 36 | | 27- 20- 13 | 29- 06- 49 |
| 181 | 1850- 7-09-14-27 | 00- 12- 33 | 28-10 | 00- 08- 34 | (29- 07- 07) |
| 181 | 1912- 7-14-13-13 | 00- 10- 47 | 28-10 | 00- 09- 58 | 29- 06- 45 |
| 182 * | 1850- 8-07-21-34 | 28- 00- 26 | | 01- 07- 28 | 29- 07- 54 |
| 182 * | 1912- 8-12-19-58 | 27- 22- 02 | | 01- 09- 49 | 29- 07- 51 |
| 183 | 1850- 9-06-05-28 | 26- 17- 32 | | 02- 15- 56 | 29- 09- 28 |
| 183 | 1912- 9-11-03-49 | 26- 15- 11 | | 02- 18- 41 | 29- 09- 52 |
| 184 | 1850-10-05-14-56 | 24- 01- 04 | | 05- 10- 40 | 29- 11- 44 |
| 184 | 1912-10-10-13-41 | 23- 21- 19 | | 05- 15- 05 | 29- 12- 24 |
| 185 | 1850-11-04-02-40 | 19- 12- 20 | | 10- 02- 16 | 29- 14- 36 |
| 185 | 1912-11-09-02-05 | 19- 08- 55 | | 10- 06- 07 | 29- 15- 02 |
| 186 | 1850-12-03-17-16 | 17- 12- 44 | | 12- 04- 44 | 29- 17- 28 |
| 186 | 1912-12-08-17-07 | 17- 09- 53 | | 12- 07- 28 | 29- 17- 21 |
| 187 | 1851- 1-02-10-44 | 16- 01- 16 | | 13- 18- 02 | 29- 19- 18 |
| 187 | 1913- 1-07-10-28 | 16- 00- 32 | | 13- 18- 22 | 29- 18- 54 |
| 188 | 1851- 2-01-06-02 | 14- 18- 58 | | 15- 00- 15 | 29- 19- 13 |
| 188 | 1913- 2-06-05-22 | 14- 18- 38 | | 15- 00- 23 | 29- 19- 01 |
| 189 | 1851- 3-03-01-15 | 13- 10- 45 | | 16- 06- 33 | 29- 17- 18 |
| 189 | 1913- 3-08-00-23 | 13- 11- 37 | | 16- 05- 48 | 29- 17- 25 |
| 190 | 1851- 4-01-18-33 | 11- 23- 27 | | 17- 15- 02 | 29- 14- 29 |
| 190 | 1913- 4-06-17-48 | 11- 23- 12 | | 17- 15- 24 | 29- 14- 36 |
| 191 | 1851- 5-01-09-02 | 09- 21- 58 | | 19- 13- 47 | 29- 11- 45 |
| 191 | 1913- 5-06-08-24 | 09- 17- 36 | | 19- 17- 57 | 29- 11- 33 |
| 192 | 1851- 5-30-20-47 | 05- 16- 13 | | 23- 17- 25 | 29- 09- 38 |
| 192 | 1913- 6-04-19-57 | 05- 09- 03 | | 24- 00- 06 | 29- 09- 09 |
| 193 | 1851- 6-29-06-25 | 02- 19- 35 | | 26- 12- 40 | 29- 08- 15 |
| 193 | 1913- 7-04-05-06 | 02- 18- 54 | | 26- 12- 58 | 29- 07- 52 |
| 194 | 1851- 7-28-14-40 | 01- 11- 20 | | 27- 20- 20 | (29- 07- 40) |
| 194 | 1913- 8-02-12-58 | 01- 10- 02 | | 27- 21- 38 | (29- 07- 40) |
| 195 * | 1851- 8-26-22-20 | 00- 12- 40 | 28-11 | 00- 08- 12 | 29- 07- 52 |
| 195 * | 1913- 8-31-20-38 | 00- 10- 22 | 28-11 | 00- 10- 57 | 29- 08- 19 |
| 196 | 1851- 9-25-06-12 | 28- 01- 48 | | 01- 07- 10 | 29- 08- 58 |
| 196 | 1913- 9-30-04-57 | 27- 23- 03 | | 01- 10- 29 | 29- 09- 32 |
| 197 | 1851-10-24-15-10 | 26- 17- 50 | | 02- 17- 06 | 29- 10- 56 |
| 197 | 1913-10-29-14-29 | 26- 15- 31 | | 02- 19- 41 | 29- 11- 12 |

TABLE 1 CONTINUED

* * * * * * * *

| COLUMN A | COLUMN B | COLUMN C | COLUMN D | COLUMN E | COLUMN F |
|---|---|---|---|---|---|
| NUMBER | YEAR-MO-DA-HR-MIN | DAS-HRS-MIN | DAS-HRS | DAS-HRS-MIN | DAS-HRS-MIN |
| 198 | 1851-11-23-02-06 | 23- 18- 54 | | 05- 18- 34 | 29- 13- 28 |
| 198 | 1913-11-28-01-41 | 23- 12- 19 | | 06- 00- 59 | 29- 13- 18 |
| 199 | 1851-12-22-15-34 | 19- 06- 26 | | 10- 09- 27 | 29- 15- 53 |
| 199 | 1913-12-27-14-59 | 19- 03- 01 | | 10- 12- 34 | 29- 15- 35 |
| 200 | 1852- 1-21-07-27 | 17- 08- 33 | | 12- 08- 54 | 29- 17- 27 |
| 200 | 1914- 1-26-06-34 | 17- 07- 26 | | 12- 10- 02 | 29- 17- 28 |
| 201 | 1852- 2-20-00-54 | 15- 22- 06 | | 13- 19- 43 | 29- 17- 49 |
| 201 | 1914- 2-25-00-02 | 15- 21- 58 | | 13- 20- 09 | 29- 18- 07 |
| 202 | 1852- 3-20-18-43 | 14- 16- 17 | | 15- 00- 45 | 29- 17- 02 |
| 202 | 1914- 3-26-18-09 | 14- 15- 51 | | 15- 01- 22 | 29- 17- 13 |
| 203 | 1852- 4-19-11-45 | 13- 09- 15 | | 16- 06- 15 | 29- 15- 30 |
| 203 | 1914- 4-25-11-22 | 13- 08- 38 | | 16- 06- 35 | 29- 15- 13 |
| 204 | 1852- 5-19-03-15 | 11- 21- 45 | | 17- 15- 47 | 29- 13- 32 |
| 204 | 1914- 5-25-02-35 | 11- 20- 25 | | 17- 16- 33 | 29- 12- 58 |
| 205 | 1852- 6-17-16-47 | 09- 20- 13 | | 19- 15- 15 | 29- 11- 28 |
| 205 | 1914- 6-23-15-33 | 09- 16- 27 | | 19- 18- 38 | 29- 11- 05 |
| 206 | 1852- 7-17-04-15 | 05- 13- 45 | | 23- 19- 58 | 29- 09- 43 |
| 206 | 1914- 7-23-02-38 | 05- 09- 22 | | 24- 00- 27 | 29- 09- 49 |
| 207 | 1852- 8-15-13-58 | 02- 20- 02 | | 26- 12- 38 | 29- 08- 40 |
| 207 | 1914- 8-21-12-27 | 02- 18- 33 | | 26- 14- 33 | 29- 09- 06 |
| 208 * | 1852- 9-13-22-38 | 01- 11- 22 | | 27- 21- 14 | 29- 08- 36 |
| 208 * | 1914- 9-19-21-33 | 01- 09- 27 | | 27- 23- 34 | 29- 09- 01 |
| 209 | 1852-10-13-07-14 | 00- 12- 46 | 28-12 | 00- 08- 41 | 29- 09- 27 |
| 209 | 1914-10-19-06-34 | 00- 09- 26 | 28-12 | 00- 12- 02 | 29- 09- 28 |
| 210 | 1852-11-11-16-41 | 28--01- 19 | | 01- 09- 32 | 29- 10- 51 |
| 210 | 1914-11-17-16-02 | 27- 21- 58 | | 01- 12- 35 | 29- 10- 33 |
| 211 | 1852-12-11-03-32 | 26- 14- 28 | | 02- 21- 53 | 29- 12- 21 |
| 211 | 1914-12-17-02-35 | 26- 11- 25 | | 03- 00- 42 | 29- 12- 07 |
| 212 | 1853- 1-09-15-53 | 23- 11- 07 | | 06- 02- 34 | 29- 13- 41 |
| 212 | 1915- 1-15-14-42 | 22- 22- 18 | | 06- 15- 31 | 29- 13- 49 |
| 213 | 1853- 2-08-05-34 | 19- 02- 26 | | 10- 12- 19 | 29- 14- 45 |
| 213 | 1915- 2-14-04-31 | 18- 22- 29 | | 10- 16- 42 | 29- 15- 11 |
| 214 | 1853- 3-09-20-19 | 17- 05- 41 | | 12- 09- 57 | 29- 15- 38 |
| 214 | 1915- 3-15-19-42 | 17- 04- 18 | | 12- 11- 36 | 29- 15- 54 |
| 215 | 1853- 4-08-11-57 | 15- 21- 03 | | 13- 19- 06 | 29- 16- 09 |
| 215 | 1915- 4-14-11-36 | 15- 19- 24 | | 13- 20- 31 | 29- 15- 55 |
| 216 | 1853- 5-08-04-06 | 14- 14- 54 | | 15- 01- 03 | 29- 15- 57 |
| 216 | 1915- 5-14-03-31 | 14- 14- 29 | | 15- 00- 57 | 29- 15- 26 |
| 217 | 1853- 6-06-20-03 | 13- 07- 57 | | 16- 06- 54 | 29- 14- 51 |
| 217 | 1915- 6-12-18-57 | 13- 07- 03 | | 16- 07- 31 | 29- 14- 34 |
| 218 | 1853- 7-06-10-54 | 11- 21- 06 | 1853-7-18-08 | 17- 16- 06 | 29- 13- 12 |
| 218 | 1915- 7-12-09-31 | 11- 19- 29 | 1915-7-24-05 | 17- 17- 52 | 29- 13- 21 |
| 219 | 1853- 8-05-00-06 | 09- 20- 54 | | 19- 14- 42 | 29- 11- 36 |
| 219 | 1915- 8-10-22-52 | 09- 15- 08 | | 19- 20- 53 | 29- 12- 01 |
| 220 | 1853- 9-03-11-42 | 05- 07- 18 | | 24- 03- 18 | 29- 10- 36 |
| 220 | 1915- 9-09-10-53 | 05- 04- 07 | | 24- 06- 42 | 29- 10- 49 |
| 221 * | 1853-10-02-22-18 | 02- 17- 42 | | 26- 16- 39 | 29- 10- 21 |
| 221 * | 1915-10-08-21-42 | 02- 14- 18 | | 26- 19- 52 | 29- 10- 10 |
| 222 | 1853-11-01-08-39 | 01- 09- 21 | | 28- 01- 13 | 29- 10- 34 |
| 222 | 1915-11-07-07-52 | 01- 06- 08 | | 28- 04- 04 | 29- 10- 12 |
| 223 | 1853-11-30-19-13 | 00- 09- 47 | 28-12 | 00- 13- 06 | 29- 10- 53 |
| 223 | 1915-12-06-18-04 | 00- 06- 56 | 28-13 | 00- 14- 45 | 29- 10- 41 |
| 224 | 1853-12-30-06-06 | 27- 19- 54 | | 01- 15- 12 | 29- 11- 06 |
| 224 | 1916- 1-05-04-45 | 27- 19- 15 | | 01- 16- 06 | 29- 11- 21 |
| 225 | 1854- 1-28-17-12 | 26- 08- 48 | | 03- 02- 39 | 29- 11- 27 |
| 225 | 1916- 2-03-16-06 | 26- 04- 54 | | 03- 06- 58 | 29- 11- 52 |
| 226 | 1854- 2-27-04-39 | 22- 23- 21 | | 06- 12- 52 | 29- 12- 13 |
| 226 | 1916- 3-04-03-58 | 22- 09- 02 | | 07- 03- 21 | 29- 12- 23 |
| 227 | 1854- 3-28-16-52 | 19- 00- 08 | | 10- 13- 14 | 29- 13- 22 |
| 227 | 1916- 4-02-16-21 | 18- 19- 39 | | 10- 17- 29 | 29- 13- 08 |
| 228 | 1854- 4-27-06-14 | 17- 04- 46 | | 12- 09- 47 | 29- 14- 33 |
| 228 | 1916- 5-02-05-29 | 17- 02- 31 | | 12- 11- 37 | 29- 14- 08 |
| 229 | 1854- 5-26-20-47 | 15- 20- 13 | | 13- 19- 02 | 29- 15- 15 |
| 229 | 1916- 5-31-19-37 | 15- 19- 23 | | 13- 19- 43 | 29- 15- 06 |
| 230 | 1854- 6-25-12-02 | 14- 14- 58 | | 15- 00- 16 | 29- 15- 14 |
| 230 | 1916- 6-30-10-43 | 14- 13- 17 | | 15- 02- 15 | 29- 15- 32 |
| 231 | 1854- 7-25-03-16 | 13- 08- 44 | | 16- 06- 00 | 29- 14- 44 |
| 231 | 1916- 7-30-02-15 | 13- 06- 45 | | 16- 08- 25 | 29- 15- 10 |
| 232 | 1854- 8-23-18-00 | 11- 22- 00 | | 17- 16- 03 | 29- 14- 03 |
| 232 | 1916- 8-28-17-25 | 11- 19- 35 | | 17- 18- 34 | 29- 14- 09 |
| 233 | 1854- 9-22-08-03 | 09- 17- 57 | | 19- 19- 25 | 29- 13- 22 |
| 233 | 1916- 9-27-07-34 | 09- 15- 26 | | 19- 21- 37 | 29- 13- 03 |
| 234 * | 1854-10-21-21-25 | 04- 23- 35 | | 24- 13- 02 | 29- 12- 37 |
| 234 * | 1916-10-26-20-37 | 04- 22- 23 | | 24- 13- 50 | 29- 12- 13 |
| 235 | 1854-11-20-10-02 | 02- 12- 58 | | 26- 22- 47 | 29- 11- 45 |
| 235 | 1916-11-25-08-50 | 02- 11- 10 | | 27- 00- 31 | 29- 11- 41 |
| 236 | 1854-12-19-21-42 | 01- 05- 13 | | 28- 05- 37 | 29- 10- 50 |
| 236 | 1916-12-24-20-31 | 01- 04- 29 | | 28- 06- 40 | 29- 11- 09 |
| 237 | 1855- 1-18-08-37 | 00- 05- 23 | 28-12 | 00- 16- 48 | 29- 10- 11 |
| 237 | 1917- 1-23-07-40 | 00- 05- 20 | 28-12 | 00- 17- 09 | 29- 10- 29 |
| 238 | 1855- 2-16-18-48 | 27- 16- 12 | | 01- 17- 45 | 29- 09- 57 |
| 238 | 1917- 2-21-18-09 | 27- 14- 51 | | 01- 19- 05 | 29- 09- 56 |
| 239 | 1855- 3-18-04-45 | 26- 03- 15 | | 03- 07- 05 | 29- 10- 20 |
| 239 | 1917- 3-23-04-05 | 25- 22- 55 | | 03- 11- 01 | 29- 09- 56 |
| 240 | 1855- 4-16-15-05 | 22- 16- 55 | | 06- 18- 13 | 29- 11- 08 |
| 240 | 1917- 4-21-14-01 | 22- 04- 59 | | 07- 05- 47 | 29- 10- 46 |
| 241 | 1855- 5-16-02-13 | 18- 21- 47 | | 10- 14- 29 | 29- 12- 16 |
| 241 | 1917- 5-21-00-47 | 18- 19- 13 | | 10- 17- 02 | 29- 12- 15 |
| 242 | 1855- 6-14-14-29 | 17- 04- 31 | | 12- 09- 01 | 29- 13- 32 |
| 242 | 1917- 6-19-13-02 | 17- 02- 58 | | 12- 11- 00 | 29- 13- 58 |
| 243 | 1855- 7-14-04-01 | 15- 20- 59 | | 13- 17- 52 | 29- 14- 51 |
| 243 | 1917- 7-19-03-00 | 15- 19- 00 | | 13- 20- 21 | 29- 15- 21 |
| 244 | 1855- 8-12-18-52 | 14- 16- 08 | | 14- 23- 52 | 29- 16- 00 |
| 244 | 1917- 8-17-18-21 | 14- 13- 39 | | 15- 02- 28 | 29- 16- 07 |
| 245 | 1855- 9-11-10-52 | 13- 11- 08 | | 16- 05- 24 | 29- 16- 32 |
| 245 | 1917- 9-16-10-28 | 13- 07- 32 | | 16- 08- 41 | 29- 16- 13 |
| 246 | 1855-10-11-03-24 | 11- 22- 36 | | 17- 17- 31 | 29- 16- 07 |
| 246 | 1917-10-16-02-41 | 11- 20- 19 | | 17- 19- 29 | 29- 15- 48 |
| 247 * | 1855-11-09-19-31 | 09- 15- 29 | | 19- 23- 18 | 29- 14- 47 |
| 247 * | 1917-11-14-18-28 | 09- 12- 32 | | 20- 02- 17 | 29- 14- 49 |
| 248 | 1855-12-09-10-18 | 04- 17- 42 | | 24- 19- 17 | 29- 12- 59 |
| 248 | 1917-12-14-09-17 | 04- 12- 43 | | 25- 00- 36 | 29- 13- 19 |
| 249 | 1856- 1-07-23-17 | 02- 08- 43 | | 27- 02- 36 | 29- 11- 19 |
| 249 | 1918- 1-12-22-36 | 02- 06- 24 | | 27- 05- 05 | 29- 11- 29 |
| 250 | 1856- 2-06-10-36 | 01- 02- 24 | | 28- 07- 39 | 29- 10- 03 |
| 250 | 1918- 2-11-10-05 | 01- 00- 55 | | 28- 08- 52 | 29- 09- 47 |
| 251 | 1856- 3-06-20-39 | 00- 04- 21 | 28-11 | 00- 17- 53 | 29- 09- 14 |
| 251 | 1918- 3-12-19-52 | 00- 03- 08 | 28-11 | 00- 18- 34 | 29- 08- 42 |
| 252 | 1856- 4-05-05-53 | 27- 13- 07 | | 01- 19- 42 | 29- 08- 49 |
| 252 | 1918- 4-11-04-34 | 27- 11- 26 | | 01- 21- 01 | 29- 08- 27 |
| 253 | 1856- 5-04-14-42 | 25- 21- 18 | | 03- 11- 40 | 29- 08- 58 |
| 253 | 1918- 5-10-13-01 | 25- 17- 59 | | 03- 15- 03 | 29- 09- 02 |
| 254 | 1856- 6-02-23-40 | 22- 07- 20 | | 07- 02- 30 | 29- 09- 50 |
| 254 | 1918- 6-08-22-03 | 22- 01- 57 | | 07- 08- 22 | 29- 10- 19 |
| 255 | 1856- 7-02-09-30 | 18- 20- 30 | | 10- 15- 08 | 29- 11- 38 |
| 255 | 1918- 7-08-08-22 | 18- 17- 38 | | 10- 18- 30 | 29- 12- 08 |
| 256 | 1856- 7-31-21-08 | 17- 03- 52 | | 12- 10- 14 | 29- 14- 06 |
| 256 | 1918- 8-06-20-30 | 17- 01- 30 | | 12- 12- 44 | 29- 14- 14 |
| 257 | 1856- 8-30-11-14 | 15- 20- 46 | | 13- 19- 48 | 29- 16- 34 |
| 257 | 1918- 9-05-10-44 | 15- 18- 16 | | 13- 22- 05 | 29- 16- 21 |
| 258 | 1856- 9-29-03-48 | 14- 15- 12 | | 15- 02- 54 | 29- 18- 06 |
| 258 | 1918-10-05-03-05 | 14- 12- 55 | | 15- 05- 02 | 29- 17- 57 |
| 259 | 1856-10-28-21-54 | 13- 08- 06 | | 16- 10- 01 | 29- 18- 07 |
| 259 | 1918-11-03-21-02 | 13- 06- 58 | | 16- 11- 19 | 29- 18- 17 |
| 260 * | 1856-11-27-16-01 | 11- 19- 59 | | 17- 20- 45 | 29- 16- 44 |
| 260 * | 1918-12-03-21-02 | 11- 16- 41 | | 18- 00- 24 | 29- 17- 05 |
| 261 | 1856-12-27-08-45 | 09- 08- 15 | | 20- 06- 26 | 29- 14- 41 |
| 261 | 1919- 1-02-08-24 | 09- 01- 36 | | 20- 13- 07 | 29- 14- 43 |
| 262 | 1857- 1-25-23-26 | 04- 10- 34 | | 25- 01- 58 | 29- 12- 32 |
| 262 | 1919- 1-31-23-07 | 04- 03- 53 | | 25- 08- 11 | 29- 12- 04 |
| 263 | 1857- 2-24-11-58 | 02- 06- 02 | | 27- 04- 28 | 29- 10- 30 |
| 263 | 1919- 3-02-11-11 | 02- 03- 49 | | 27- 06- 05 | 29- 09- 54 |
| 264 | 1857- 3-25-22-28 | 01- 01- 32 | | 28- 07- 14 | 29- 08- 46 |
| 264 | 1919- 3-31-21-05 | 00- 23- 55 | | 28- 08- 30 | 29- 08- 25 |
| 265 | 1857- 4-24-07-14 | 00- 02- 46 | 28-10 | 00- 18- 48 | 29- 07- 34 |
| 265 | 1919- 4-30-05-30 | 00- 01- 30 | 28-10 | 00- 20- 12 | 29- 07- 42 |
| 266 | 1857- 5-23-14-48 | 27- 11- 12 | | 01- 20- 03 | 29- 07- 15 |
| 266 | 1919- 5-29-13-12 | 27- 08- 48 | | 01- 22- 53 | 29- 07- 41 |
| 267 | 1857- 6-21-22-03 | 25- 20- 57 | | 03- 11- 12 | 29- 08- 09 |
| 267 | 1919- 6-27-20-53 | 25- 17- 07 | | 03- 15- 21 | 29- 08- 28 |
| 268 | 1857- 7-21-06-12 | 22- 08- 48 | | 07- 01- 26 | 29- 10- 14 |
| 268 | 1919- 7-27-05-21 | 21- 23- 39 | | 07- 10- 37 | 29- 10- 16 |
| 269 | 1857- 8-19-16-26 | 18- 20- 34 | | 10- 16- 33 | 29- 13- 07 |
| 269 | 1919- 8-25-15-37 | 18- 16- 23 | | 10- 20- 34 | 29- 12- 57 |

TABLE 1 CONTINUED

* * * * * * * *

| COLUMN A | COLUMN B | COLUMN C | COLUMN D | COLUMN E | COLUMN F |
|---|---|---|---|---|---|
| NUMBER | YEAR-MO-DA-HR-MIN | DAS-HRS-MIN | DAS-HRS | DAS-HRS-MIN | DAS-HRS-MIN |
| 270 | 1857- 9-18-05-33 | 17- 02- 27 | | 12- 13- 38 | 29- 16- 05 |
| 270 | 1919- 9-24-04-34 | 17- 00- 26 | | 12- 15- 40 | 29- 16- 06 |
| 271 | 1857-10-17-21-38 | 15- 19- 22 | | 13- 22- 54 | 29- 18- 16 |
| 271 | 1919-10-23-20-40 | 15- 17- 20 | | 14- 01- 20 | 29- 18- 40 |
| 272 | 1857-11-16-15-54 | 14- 13- 06 | | 15- 06- 01 | 29- 19- 07 |
| 272 | 1919-11-22-15-20 | 14- 11- 40 | | 15- 07- 55 | 29- 19- 35 |
| 273 * | 1857-12-16-11-01 | 13- 05- 59 | | 16- 12- 32 | 29- 18- 31 |
| 273 * | 1919-12-22-10-55 | 13- 04- 05 | | 16- 14- 27 | 29- 18- 32 |
| 274 | 1858- 1-15-05-32 | 11- 15- 28 | | 18- 01- 13 | 29- 16- 41 |
| 274 | 1920- 1-21-05-27 | 11- 12- 33 | | 18- 03- 35 | 29- 16- 08 |
| 275 | 1858- 2-13-22-13 | 08- 21- 47 | | 20- 16- 12 | 29- 13- 59 |
| 275 | 1920- 2-19-21-35 | 08- 16- 25 | | 20- 20- 56 | 29- 13- 21 |
| 276 | 1858- 3-15-12-12 | 04- 04- 48 | | 25- 06- 15 | 29- 11- 03 |
| 276 | 1920- 3-20-10-56 | 04- 01- 04 | | 25- 09- 43 | 29- 10- 47 |
| 277 | 1858- 4-13-23-15 | 02- 04- 45 | | 27- 03- 48 | 29- 08- 33 |
| 277 | 1920- 4-18-21-43 | 02- 03- 17 | | 27- 05- 25 | 29- 08- 42 |
| 278 | 1858- 5-13-07-48 | 01- 00- 12 | | 28- 06- 46 | 29- 06- 58 |
| 278 | 1920- 5-18-06-25 | 00- 23- 35 | | 28- 07- 41 | 29- 07- 16 |
| 279 | 1858- 6-11-14-46 | 00- 03- 14 | 28-09 | 00- 18- 24 | 29- 06- 38 |
| 279 | 1920- 6-16-13-41 | 00- 01- 19 | 28-09 | 00- 20- 25 | 29- 06- 44 |
| 280 | 1858- 7-10-21-24 | 27- 10- 36 | | 01- 20- 54 | 29- 07- 30 |
| 280 | 1920- 7-15-20-25 | 27- 09- 35 | | 01- 21- 44 | 29- 07- 19 |
| 281 | 1858- 8-09-04-54 | 25- 21- 06 | | 03- 12- 15 | 29- 09- 21 |
| 281 | 1920- 8-14-03-44 | 25- 18- 16 | | 03- 14- 52 | 29- 09- 08 |
| 282 | 1858- 9-07-14-15 | 22- 03- 45 | | 07- 08- 07 | 29- 11- 52 |
| 282 | 1920- 9-12-12-52 | 21- 21- 08 | | 07- 14- 50 | 29- 11- 58 |
| 283 | 1858-10-07-02-07 | 18- 15- 53 | | 10- 22- 48 | 29- 14- 41 |
| 283 | 1920-10-12-00-50 | 18- 14- 10 | | 11- 01- 05 | 29- 15- 15 |
| 284 | 1858-11-05-16-48 | 17- 00- 12 | | 12- 17- 10 | 29- 17- 22 |
| 284 | 1920-11-10-16-05 | 16- 21- 55 | | 12- 20- 04 | 29- 17- 59 |
| 285 | 1858-12-05-10-10 | 15- 15- 50 | | 14- 03- 26 | 29- 19- 16 |
| 285 | 1920-12-10-10-04 | 15- 13- 56 | | 14- 05- 27 | 29- 19- 23 |
| 286 * | 1859- 1-04-05-26 | 14- 10- 34 | | 15- 09- 04 | 29- 19- 38 |
| 286 * | 1921- 1-09-05-27 | 14- 08- 33 | | 15- 10- 37 | 29- 19- 10 |
| 287 | 1859- 2-03-01-04 | 13- 00- 56 | | 16- 17- 11 | 29- 18- 07 |
| 287 | 1921- 2-08-00-37 | 12- 23- 23 | | 16- 18- 09 | 29- 17- 32 |
| 288 | 1859- 3-04-19-11 | 11- 09- 49 | | 18- 06- 18 | 29- 16- 07 |
| 288 | 1921- 3-09-18-09 | 11- 06- 51 | | 18- 08- 05 | 29- 14- 56 |
| 289 | 1859- 4-03-11-18 | 08- 10- 42 | | 21- 00- 04 | 29- 10- 46 |
| 289 | 1921- 4-08-09-05 | 08- 05- 55 | | 21- 06- 02 | 29- 11- 57 |
| 290 | 1859- 5-02-22-03 | 04- 02- 56 | | 25- 06- 10 | 29- 09- 06 |
| 290 | 1921- 5-07-21-02 | 03- 22- 58 | | 25- 10- 15 | 29- 09- 13 |
| 291 | 1859- 6-01-07-10 | 02- 04- 50 | | 27- 02- 41 | 29- 07- 31 |
| 291 | 1921- 6-06-06-15 | 02- 02- 45 | | 27- 04- 36 | 29- 07- 21 |
| 292 | 1859- 6-30-14-41 | 01- 01- 19 | | 28- 05- 44 | 29- 07- 03 |
| 292 | 1921- 7-05-13-36 | 00- 23- 24 | | 28- 07- 18 | 29- 06- 42 |
| 293 | 1859- 7-29-21-44 | 00- 02- 16 | 28-10 | 00- 19- 14 | 29- 07- 30 |
| 293 | 1921- 8-03-20-18 | 00- 01- 42 | 28-09 | 00- 20- 33 | 29- 07- 15 |
| 294 | 1859- 8-28-05-14 | 27- 11- 46 | | 01- 20- 56 | 29- 08- 42 |
| 294 | 1921- 9-02-03-33 | 27- 10- 27 | | 01- 22- 26 | 29- 08- 53 |
| 295 | 1859- 9-26-13-56 | 25- 22- 04 | | 03- 12- 32 | 29- 10- 36 |
| 295 | 1921-10-01-12-26 | 25- 18- 34 | | 03- 16- 38 | 29- 11- 12 |
| 296 | 1859-10-26-00-32 | 21- 19- 28 | | 07- 17- 43 | 29- 13- 11 |
| 296 | 1921-10-30-23-38 | 21- 10- 22 | | 08- 03- 26 | 29- 13- 48 |
| 297 | 1859-11-24-13-43 | 18- 12- 17 | | 11- 03- 47 | 29- 16- 04 |
| 297 | 1921-11-29-13-26 | 18- 08- 34 | | 11- 07- 39 | 29- 16- 13 |
| 298 | 1859-12-24-05-47 | 16- 21- 13 | | 12- 21- 17 | 29- 18- 30 |
| 298 | 1921-12-29-05-39 | 16- 18- 21 | | 12- 23- 48 | 29- 18- 09 |
| 299 * | 1860- 1-23-00-17 | 15- 13- 43 | | 14- 05- 39 | 29- 19- 22 |
| 299 * | 1922- 1-27-23-48 | 15- 11- 12 | | 14- 07- 48 | 29- 19- 00 |
| 300 | 1860- 2-21-19-39 | 14- 06- 21 | | 15- 11- 56 | 29- 18- 17 |
| 300 | 1922- 2-26-18-48 | 14- 05- 12 | | 15- 13- 03 | 29- 18- 15 |
| 301 | 1860- 3-22-13-56 | 12- 22- 04 | | 16- 17- 45 | 29- 15- 49 |
| 301 | 1922- 3-28-13-03 | 12- 19- 57 | | 16- 20- 04 | 29- 16- 01 |
| 302 | 1860- 4-21-05-45 | 11- 05- 15 | | 18- 07- 46 | 29- 13- 01 |
| 302 | 1922- 4-27-05-04 | 11- 01- 50 | | 18- 11- 04 | 29- 13- 00 |
| 303 | 1860- 5-20-18-46 | 08- 08- 14 | | 21- 02- 23 | 29- 10- 37 |
| 303 | 1922- 5-26-18-04 | 08- 00- 56 | | 21- 09- 20 | 29- 10- 16 |
| 304 | 1860- 6-19-05-23 | 04- 15- 37 | | 24- 17- 19 | 29- 08- 56 |
| 304 | 1922- 6-25-04-20 | 03- 22- 40 | | 25- 09- 47 | 29- 08- 27 |
| 305 | 1860- 7-18-14-19 | 02- 04- 41 | | 27- 03- 19 | 29- 08- 00 |
| 305 | 1922- 7-24-12-47 | 02- 03- 13 | | 27- 04- 34 | 29- 07- 47 |

| COLUMN A | COLUMN B | COLUMN C | COLUMN D | COLUMN E | COLUMN F |
|---|---|---|---|---|---|
| NUMBER | YEAR-MO-DA-HR-MIN | DAS-HRS-MIN | DAS-HRS | DAS-HRS-MIN | DAS-HRS-MIN |
| 306 | 1860- 8-16-22-19 | 01- 00- 41 | | 28- 07- 09 | 29- 07- 50 |
| 306 | 1922- 8-22-20-34 | 00- 23- 26 | | 28- 08- 38 | 29- 08- 04 |
| 307 | 1860- 9-15-06-09 | 00- 01- 51 | 28-11 | 00- 19- 37 | 29- 08- 28 |
| 307 | 1922- 9-21-04-28 | 00- 01- 22 | 28-11 | 00- 20- 40 | 29- 09- 02 |
| 308 | 1860-10-14-14-37 | 27- 12- 23 | | 01- 21- 36 | 29- 09- 59 |
| 308 | 1922-10-20-13-40 | 27- 10- 20 | | 02- 00- 06 | 29- 10- 26 |
| 309 | 1860-11-13-00-36 | 25- 19- 24 | | 03- 16- 48 | 29- 12- 12 |
| 309 | 1922-11-19-00-06 | 25- 15- 54 | | 03- 20- 20 | 29- 12- 14 |
| 310 | 1860-12-12-12-48 | 21- 07- 12 | | 08- 07- 27 | 29- 14- 39 |
| 310 | 1922-12-18-12-20 | 20- 23- 40 | | 08- 14- 41 | 29- 14- 21 |
| 311 | 1861- 1-11-03-27 | 18- 07- 33 | | 11- 09- 05 | 29- 16- 38 |
| 311 | 1923- 1-17-02-41 | 18- 04- 19 | | 11- 12- 07 | 29- 16- 26 |
| 312 * | 1861- 2-09-20-05 | 16- 16- 55 | | 13- 00- 38 | 29- 17- 33 |
| 312 * | 1923- 2-15-19-07 | 16- 15- 53 | | 13- 01- 51 | 29- 17- 44 |
| 313 | 1861- 3-11-13-38 | 15- 10- 22 | | 14- 06- 56 | 29- 17- 18 |
| 313 | 1923- 3-17-12-51 | 15- 08- 09 | | 14- 09- 28 | 29- 17- 37 |
| 314 | 1861- 4-10-06-56 | 14- 04- 04 | | 15- 12- 08 | 29- 16- 12 |
| 314 | 1923- 4-16-06-28 | 14- 01- 32 | | 15- 14- 38 | 29- 16- 10 |
| 315 | 1861- 5-09-23-08 | 12- 18- 52 | | 16- 19- 38 | 29- 14- 30 |
| 315 | 1923- 5-15-22-38 | 12- 17- 22 | | 16- 20- 42 | 29- 14- 04 |
| 316 | 1861- 6-08-13-38 | 11- 02- 22 | | 18- 10- 12 | 29- 12- 34 |
| 316 | 1923- 6-14-12-42 | 11- 01- 18 | | 18- 11- 45 | 29- 13- 03 |
| 317 | 1861- 7-08-02-12 | 08- 05- 48 | | 21- 04- 54 | 29- 10- 42 |
| 317 | 1923- 7-14-01-45 | 08- 00- 15 | | 21- 09- 17 | 29- 09- 32 |
| 318 | 1861- 8-06-12-54 | 04- 02- 06 | | 25- 07- 12 | 29- 09- 18 |
| 318 | 1923- 8-12-11-17 | 03- 22- 43 | | 25- 10- 53 | 29- 09- 36 |
| 319 | 1861- 9-04-22-12 | 02- 02- 48 | | 27- 05- 56 | 29- 08- 44 |
| 319 | 1923- 9-10-20-53 | 02- 01- 07 | | 27- 08- 06 | 29- 09- 13 |
| 320 | 1861-10-04-06-56 | 00- 23- 04 | 28-10 | 00- 00- 03 | 29- 09- 07 |
| 320 | 1923-10-10-06-06 | 00- 21- 54 | 28-11 | 00- 00- 27 | 29- 09- 21 |
| 321 | 1861-11-02-16-03 | 28- 12- 57 | | 00- 21- 17 | 29- 10- 14 |
| 321 | 1923-11-08-15-57 | 28- 11- 33 | | 00- 22- 30 | 29- 10- 03 |
| 322 | 1861-12-02-02-17 | 27- 10- 43 | | 02- 00- 54 | 29- 11- 37 |
| 322 | 1923-12-08-01-30 | 27- 08- 30 | | 02- 02- 48 | 29- 11- 18 |
| 323 | 1861-12-31-13-54 | 25- 12- 06 | | 04- 00- 50 | 29- 12- 56 |
| 323 | 1924- 1-06-12-48 | 25- 08- 12 | | 04- 04- 38 | 29- 12- 50 |
| 324 | 1862- 1-30-02-50 | 20- 19- 10 | | 08- 18- 49 | 29- 13- 59 |
| 324 | 1924- 2-05-01-38 | 20- 14- 22 | | 08- 23- 58 | 29- 14- 20 |
| 325 * | 1862- 2-28-16-49 | 18- 03- 11 | | 11- 11- 45 | 29- 14- 56 |
| 325 * | 1924- 3-05-15-58 | 18- 01- 02 | | 11- 14- 17 | 29- 15- 19 |
| 326 | 1862- 3-30-07-45 | 16- 15- 15 | | 13- 00- 27 | 29- 15- 42 |
| 326 | 1924- 4-04-07-17 | 16- 12- 43 | | 13- 03- 00 | 29- 15- 43 |
| 327 | 1862- 4-28-23-27 | 15- 08- 33 | | 14- 07- 26 | 29- 15- 59 |
| 327 | 1924- 5-03-23-00 | 15- 06- 00 | | 14- 09- 34 | 29- 15- 34 |
| 328 | 1862- 5-28-15-26 | 14- 02- 34 | | 15- 12- 54 | 29- 15- 28 |
| 328 | 1924- 6-02-14-34 | 14- 00- 26 | | 15- 14- 35 | 29- 15- 01 |
| 329 | 1862- 6-27-06-54 | 12- 18- 06 | 1862-7-10-01 | 16- 20- 05 | 29- 14- 11 |
| 329 | 1924- 7-02-05-35 | 12- 16- 25 | 1924-7-14-22 | 16- 21- 42 | 29- 14- 07 |
| 330 | 1862- 7-26-21-05 | 11- 02- 55 | | 18- 09- 40 | 29- 12- 35 |
| 330 | 1924- 7-31-19-42 | 11- 00- 18 | | 18- 12- 37 | 29- 12- 55 |
| 331 | 1862- 8-25-09-40 | 08- 05- 20 | | 21- 05- 58 | 29- 11- 18 |
| 331 | 1924- 8-30-08-37 | 07- 22- 23 | | 21- 13- 16 | 29- 11- 39 |
| 332 | 1862- 9-23-20-58 | 03- 23- 02 | | 25- 11- 37 | 29- 10- 39 |
| 332 | 1924- 9-28-20-16 | 03- 17- 44 | | 25- 16- 57 | 29- 10- 41 |
| 333 | 1862-10-23-07-37 | 02- 00- 23 | | 27- 10- 15 | 29- 10- 38 |
| 333 | 1924-10-28-06-57 | 01- 22- 03 | | 27- 12- 16 | 29- 10- 19 |
| 334 | 1862-11-21-18-15 | 00- 20- 45 | 28-13 | 00- 01- 04 | 29- 10- 49 |
| 334 | 1924-11-26-17-16 | 00- 19- 44 | 28-12 | 00- 02- 46 | 29- 10- 30 |
| 335 | 1862-12-21-05-04 | 28- 11- 56 | | 00- 23- 02 | 29- 10- 58 |
| 335 | 1924-12-26-03-46 | 28- 10- 14 | | 01- 00- 45 | 29- 10- 59 |
| 336 | 1863- 1-19-16-02 | 27- 06- 58 | | 02- 04- 06 | 29- 11- 04 |
| 336 | 1925- 1-24-14-45 | 27- 04- 15 | | 02- 07- 12 | 29- 11- 27 |
| 337 | 1863- 2-18-03-06 | 25- 03- 54 | | 04- 07- 37 | 29- 11- 31 |
| 337 | 1925- 2-23-02-12 | 24- 22- 48 | | 04- 13- 03 | 29- 11- 51 |
| 338 * | 1863- 3-19-14-37 | 20- 14- 23 | | 08- 22- 05 | 29- 12- 28 |
| 338 * | 1925- 3-24-14-03 | 20- 07- 57 | | 09- 04- 28 | 29- 12- 25 |
| 339 | 1863- 4-18-03-05 | 18- 02- 55 | | 11- 10- 49 | 29- 13- 44 |
| 339 | 1925- 4-23-02-28 | 17- 23- 32 | | 11- 13- 48 | 29- 13- 20 |
| 340 | 1863- 5-17-16-49 | 16- 14- 11 | | 13- 00- 36 | 29- 14- 47 |
| 340 | 1925- 5-22-15-48 | 16- 12- 12 | | 13- 02- 17 | 29- 14- 29 |
| 341 | 1863- 6-16-07-36 | 15- 07- 24 | | 14- 07- 54 | 29- 15- 18 |
| 341 | 1925- 6-21-06-17 | 15- 05- 43 | | 14- 09- 40 | 29- 15- 23 |

TABLE 1 CONTINUED

* * * * * * * *

| COLUMN A | COLUMN B | COLUMN C | COLUMN D | COLUMN E | COLUMN F |
|---|---|---|---|---|---|
| NUMBER | YEAR-MO-DA-HR-MIN | DAS-HRS-MIN | DAS-HRS | DAS-HRS-MIN | DAS-HRS-MIN |
| 342 | 1863- 7-15-22-54 | 14- 02- 06 | | 15- 13- 03 | 29- 15- 09 |
| 342 | 1925- 7-20-21-40 | 14- 00- 20 | | 15- 15- 15 | 29- 15- 35 |
| 343 | 1863- 8-14-14-03 | 12- 18- 57 | | 16- 19- 42 | 29- 14- 39 |
| 343 | 1925- 8-19-13-15 | 12- 16- 45 | | 16- 22- 12 | 29- 14- 57 |
| 344 | 1863- 9-13-04-42 | 11- 03- 18 | | 18- 10- 42 | 29- 14- 00 |
| 344 | 1925- 9-18-04-12 | 11- 00- 48 | | 18- 13- 06 | 29- 13- 54 |
| 345 | 1863-10-12-18-42 | 08- 02- 18 | | 21-.10- 59 | 29- 13- 17 |
| 345 | 1925-10-17-18-06 | 07- 17- 54 | | 21- 18- 58 | 29- 12- 52 |
| 346 | 1863-11-11-07-59 | 03- 17- 01 | | 25- 19- 24 | 29- 12- 25 |
| 346 | 1925-11-16-06-58 | 03- 13- 02 | | 25- 23- 07 | 29- 12- 07 |
| 347 | 1863-12-10-20-24 | 01- 20- 36 | | 27- 14- 46 | 29- 11- 22 |
| 347 | 1925-12-15-19-05 | 01- 18- 55 | | 27- 16- 35 | 29- 11- 30 |
| 348 | 1864- 1-09-07-46 | 00- 18- 14 | 28-13 | 00- 03- 10 | 29- 10- 24 |
| 348 | 1926- 1-14-06-35 | 00- 17- 25 | 28-12 | 00- 05- 20 | 29- 10- 45 |
| 349 | 1864- 2-07-18-10 | 28- 07- 50 | | 01- 01- 59 | 29- 09- 49 |
| 349 | 1926- 2-12-17-20 | 28- 06- 40 | | 01- 03- 20 | 29- 10- 00 |
| 350 | 1864- 3-08-03-59 | 27- 02- 01 | | 02- 07- 49 | 29- 09- 50 |
| 350 | 1926- 3-14-03-20 | 26- 23- 40 | | 02- 09- 56 | 29- 09- 36 |
| 351 * | 1864- 4-06-13-49 | 24- 21- 11 | | 04- 13- 14 | 29- 10- 25 |
| 351 * | 1926- 4-12-12-56 | 24- 17- 04 | | 04- 16- 55 | 29- 09- 59 |
| 352 | 1864- 5-06-00-14 | 20- 11- 46 | | 08- 23- 40 | 29- 11- 26 |
| 352 | 1926- 5-11-22-55 | 20- 07- 05 | | 09- 04- 08 | 29- 11- 13 |
| 353 | 1864- 6-04-11-40 | 18- 01- 20 | | 11- 11- 24 | 29- 12- 44 |
| 353 | 1926- 6-10-10-08 | 17- 23- 52 | | 11- 13- 06 | 29- 12- 58 |
| 354 | 1864- 7-04-00-24 | 16- 13- 36 | | 13- 00- 34 | 29- 14- 10 |
| 354 | 1926- 7-09-23-06 | 16- 11- 54 | | 13- 02- 49 | 29- 14- 43 |
| 355 | 1864- 8-02-14-34 | 15- 07- 26 | | 14- 08- 08 | 29- 15- 34 |
| 355 | 1926- 8-08-13-49 | 15- 06- 11 | | 14- 09- 45 | 29- 15- 56 |
| 356 | 1864- 9-01-06-08 | 14- 01- 52 | | 15- 14- 43 | 29- 16- 35 |
| 356 | 1926- 9-07-05-45 | 14- 00- 15 | | 15- 16- 13 | 29- 16- 28 |
| 357 | 1864- 9-30-22-43 | 12- 19- 17 | | 16- 21- 28 | 29- 16- 45 |
| 357 | 1926-10-06-22-13 | 12- 16- 47 | | 16- 23- 34 | 29- 16- 21 |
| 358 | 1864-10-30-15-28 | 11- 02- 32 | | 18- 13- 17 | 29- 15- 49 |
| 358 | 1926-11-05-14-34 | 10- 23- 26 | | 18- 16- 12 | 29- 15- 38 |
| 359 | 1864-11-29-07-17 | 07- 14- 43 | | 21- 23- 44 | 29- 14- 27 |
| 359 | 1926-12-05-06-12 | 07- 07- 48 | | 22- 06- 28 | 29- 14- 16 |
| 360 | 1864-12-28-21-44 | 03- 09- 16 | | 26- 02- 30 | 29- 11- 46 |
| 360 | 1927- 1-03-20-28 | 03- 06- 32 | | 26- 05- 54 | 29- 12- 26 |
| 361 | 1865- 1-27-09-30 | 01- 17- 30 | | 27- 17- 03 | 29- 10- 33 |
| 361 | 1927- 2-02-08-54 | 01- 16- 06 | | 27- 18- 25 | 29- 10- 31 |
| 362 | 1865- 2-25-20-03 | 00- 15- 57 | 28-12 | 00- 05- 28 | 29- 09- 25 |
| 362 | 1927- 3-03-19-25 | 00- 14- 35 | 28-12 | 00- 06- 24 | 29- 08- 59 |
| 363 | 1865- 3-27-05-28 | 28- 04- 32 | | 01- 04- 13 | 29- 08- 45 |
| 363 | 1927- 4-02-04-24 | 28- 02- 36 | | 01- 05- 40 | 29- 08- 16 |
| 364 * | 1865- 4-25-14-13 | 26- 21- 47 | | 02- 10- 49 | 29- 08- 36 |
| 364 * | 1927- 5-01-12-40 | 26- 19- 21 | | 02- 13- 06 | 29- 08- 26 |
| 365 | 1865- 5-24-22-49 | 25- 17- 11 | ?? ?? | 03- 15- 57 | 29- 08- 08 |
| 365 | 1927- 5-30-21-06 | 24- 12- 54 | | 04- 20- 32 | 29- 09- 26 |
| 366 | 1865- 6-23-07-57 | 20- 11- 03 | | 08- 23- 29 | 29- 10- 32 |
| 366 | 1927- 6-29-06-32 | 20- 05- 28 | | 09- 05- 36 | 29- 11- 04 |
| 367 | 1865- 7-22-18-29 | 18- 00- 31 | | 11- 12- 17 | 29- 12- 48 |
| 367 | 1927- 7-28-17-36 | 17- 22- 24 | | 11- 14- 46 | 29- 13- 10 |
| 368 | 1865- 8-21-07-17 | 16- 13- 43 | | 13- 01- 46 | 29- 15- 29 |
| 368 | 1927- 8-27-06-46 | 16- 11- 14 | | 13- 04- 11 | 29- 15- 25 |
| 369 | 1865- 9-19-22-46 | 15- 07- 14 | | 14- 10- 28 | 29- 17- 42 |
| 369 | 1927- 9-25-22-11 | 15- 04- 49 | | 14- 12- 37 | 29- 17- 26 |
| 370 | 1865-10-19-16-28 | 14- 01- 32 | | 15- 17- 00 | (29- 18- 32) |
| 370 | 1927-10-25-15-37 | 13- 23- 23 | | 15- 19- 09 | (29- 18- 32) |
| 371 | 1865-11-18-11-00 | 12- 17- 00 | | 17- 00- 45 | 29- 17- 45 |
| 371 | 1927-11-24-10-09 | 12- 14- 51 | | 17- 03- 13 | 29- 18- 04 |
| 372 | 1865-12-18-04-45 | 10- 22- 15 | | 18- 17- 37 | 29- 15- 52 |
| 372 | 1927-12-24-04-13 | 10- 18- 47 | | 18- 21- 19 | 29- 16- 06 |
| 373 | 1866- 1-16-20-32 | 07- 01- 28 | | 22- 12- 13 | 29- 13- 41 |
| 373 | 1928- 1-22-20-19 | 06- 15- 41 | | 22- 21- 41 | 29- 13- 22 |
| 374 | 1866- 2-15-10-13 | 03- 05- 47 | | 26- 05- 37 | 29- 11- 24 |
| 374 | 1928- 2-21-09-41 | 03- 02- 19 | | 26- 08- 29 | 29- 10- 48 |
| 375 | 1866- 3-16-21-37 | 01- 16- 23 | | 27- 17- 03 | 29- 09- 26 |
| 375 | 1928- 3-21-20-29 | 01- 14- 31 | | 27- 18- 25 | 29- 08- 56 |
| 376 | 1866- 4-15-07-03 | 00- 14- 57 | 28-11 | 00- 05- 58 | 29- 07- 55 |
| 376 | 1928- 4-20-05-25 | 00- 13- 35 | 28-11 | 00- 07- 14 | 29- 07- 49 |
| 377 * | 1866- 5-14-14-58 | 28- 02- 02 | | 01- 05- 07 | 29- 07- 09 |
| 377 * | 1928- 5-19-13-14 | 28- 00- 46 | | 01- 06- 42 | 29- 07- 28 |
| 378 | 1866- 6-12-22-07 | 26- 20- 53 | | 02- 10- 35 | 29- 07- 28 |
| 378 | 1928- 6-17-20-42 | 26- 18- 18 | | 02- 13- 36 | 29- 07- 54 |
| 379 | 1866- 7-12-05-35 | 24- 17- 25 | | 04- 15- 36 | 29- 09- 01 |
| 379 | 1928- 7-17-04-36 | 24- 11- 33 | | 04- 21- 40 | 29- 09- 13 |
| 380 | 1866- 8-10-14-36 | 20- 09- 24 | | 09- 02- 14 | 29- 11- 38 |
| 380 | 1928- 8-15-13-49 | 20- 03- 11 | | 09- 08- 21 | 29- 11- 32 |
| 381 | 1866- 9-09-02-14 | 17- 23- 46 | | 11- 14- 58 | 29- 14- 44 |
| 381 | 1928- 9-14-01-21 | 17- 20- 39 | | 11- 17- 56 | 29- 14- 35 |
| 382 | 1866-10-08-16-58 | 16- 12- 02 | | 13- 05- 25 | 29- 17- 27 |
| 382 | 1928-10-13-15-56 | 16- 10- 04 | | 13- 07- 35 | 29- 17- 39 |
| 383 | 1866-11-07-10-25 | 15- 05- 35 | | 14- 13- 25 | 29- 19- 00 |
| 383 | 1928-11-12-09-35 | 15- 04- 25 | | 14- 15- 06 | 29- 19- 31 |
| 384 | 1866-12-07-05-25 | 13- 23- 35 | | 15- 19- 30 | 29- 19- 05 |
| 384 | 1928-12-12-05-06 | 13- 21- 54 | | 15- 21- 28 | 29- 19- 22 |
| 385 | 1867- 1-06-00-30 | 12- 13- 30 | | 17- 04- 16 | 29- 17- 46 |
| 385 | 1929- 1-11-00-28 | 12- 11- 32 | | 17- 05- 55 | 29- 17- 27 |
| 386 | 1867- 2-04-18-16 | 10- 15- 44 | | 18- 23- 38 | 29- 15- 22 |
| 386 | 1929- 2-09-17-55 | 10- 13- 05 | | 19- 01- 37 | 29- 14- 42 |
| 387 | 1867- 3-06-09-38 | 06- 13- 22 | | 22- 23- 04 | 29- 12- 26 |
| 387 | 1929- 3-11-08-37 | 06- 05- 23 | | 23- 06- 33 | 29- 11- 56 |
| 388 | 1867- 4-04-22-04 | 03- 02- 56 | | 26- 06- 40 | 29- 09- 36 |
| 388 | 1929- 4-09-20-33 | 03- 01- 27 | | 26- 08- 07 | 29- 09- 34 |
| 389 | 1867- 5-04-07-40 | 01- 15- 20 | | 27- 16- 12 | 29- 07- 32 |
| 389 | 1929- 5-09-06-07 | 01- 13- 53 | | 27- 17- 56 | 29- 07- 49 |
| 390 * | 1867- 6-02-15-12 | 00- 14- 48 | 28-09 | 00- 06- 48 | 29- 06- 36 |
| 390 * | 1929- 6-07-13-56 | 00- 14- 04 | 28-09 | 00- 07- 47 | 29- 06- 51 |
| 391 | 1867- 7-01-21-48 | 28- 02- 12 | | 01- 04- 43 | 29- 06- 55 |
| 391 | 1929- 7-06-20-47 | 28- 00- 13 | | 01- 06- 40 | 29- 06- 53 |
| 392 | 1867- 7-31-04-43 | 26- 21- 17 | | 02- 11- 05 | 29- 08- 22 |
| 392 | 1929- 8-05-03-40 | 26- 19- 20 | | 02- 12- 48 | 29- 08- 08 |
| 393 | 1867- 8-29-13-05 | 24- 16- 55 | | 04- 17- 42 | 29- 10- 37 |
| 393 | 1929- 9-03-11-48 | 24- 13- 12 | | 04- 21- 19 | 29- 10- 31 |
| 394 | 1867- 9-27-23-42 | 20- 03- 18 | | 09- 10- 03 | 29- 13- 21 |
| 394 | 1929-10-02-22-19 | 19- 23- 41 | | 09- 14- 01 | 29- 13- 42 |
| 395 | 1867-10-27-13-03 | 17- 19- 57 | | 11- 20- 11 | 29- 16- 08 |
| 395 | 1929-11-01-12-01 | 17- 17- 59 | | 11- 22- 48 | 29- 16- 47 |
| 396 | 1867-11-26-05-11 | 16- 08- 47 | | 13- 09- 39 | 29- 18- 28 |
| 396 | 1929-12-01-04-48 | 16- 07- 12 | | 13- 11- 42 | 29- 18- 54 |
| 397 | 1867-12-25-23-39 | 15- 02- 21 | | 14- 17- 18 | 29- 19- 39 |
| 397 | 1929-12-30-23-42 | 15- 00- 18 | | 14- 19- 07 | 29- 19- 25 |
| 398 | 1868- 1-24-19-18 | 13- 19- 42 | | 15- 23- 20 | 29- 19- 02 |
| 398 | 1930- 1-29-19-07 | 13- 17- 53 | | 16- 00- 33 | 29- 18- 26 |
| 399 | 1868- 2-23-14-20 | 12- 08- 40 | | 17- 07- 59 | 29- 16- 39 |
| 399 | 1930- 2-28-13-33 | 12- 06- 27 | | 17- 09- 46 | 29- 16- 13 |
| 400 | 1868- 3-24-06-59 | 10- 09- 01 | | 19- 04- 20 | 29- 13- 21 |
| 400 | 1930- 3-30-05-46 | 10- 05- 14 | | 19- 08- 08 | 29- 13- 22 |
| 401 | 1868- 4-22-20-20 | 06- 06- 40 | | 23- 03- 36 | 29- 10- 16 |
| 401 | 1930- 4-28-19-08 | 05- 23- 52, | | 23- 10- 37 | 29- 10- 29 |
| 402 | 1868- 5-22-06-36 | 03- 02- 24 | | 26- 05- 45 | 29- 08- 09 |
| 402 | 1930- 5-28-05-37 | 03- 00- 23 | | 26- 07- 47 | 29- 08- 10 |
| 403 * | 1868- 6-20-14-45 | 01- 15- 15 | | 27- 15- 56 | 29- 07- 11 |
| 403 * | 1930- 6-26-13-47 | 01- 13- 13 | | 27- 17- 42 | 29- 06- 55 |
| 404 | 1868- 7-19-21-56 | 00- 15- 04 | 28-10 | 00- 06- 12 | 29- 07- 16 |
| 404 | 1930- 7-25-20-42 | 00- 13- 18 | 28-10 | 00- 07- 37 | 29- 06- 55 |
| 405 | 1868- 8-18-05-12 | 28- 02- 48 | | 01- 05- 20 | 29- 08- 08 |
| 405 | 1930- 8-24-03-37 | 28- 01- 23 | | 01- 06- 42 | 29- 08- 05 |
| 406 | 1868- 9-16-13-20 | 26- 21- 40 | | 02- 12- 01 | 29- 09- 41 |
| 406 | 1930- 9-22-11-42 | 26- 20- 18 | | 02- 13- 48 | 29- 10- 06 |
| 407 | 1868-10-15-23-01 | 24- 14- 59 | | 04- 20- 56 | 29- 11- 55 |
| 407 | 1930-10-21-21-48 | 24- 09- 12 | | 05- 03- 21 | 29- 12- 33 |
| 408 | 1868-11-14-10-56 | 19- 21- 04 | | 09- 17- 33 | 29- 14- 37 |
| 408 | 1930-11-20-10-21 | 19- 15- 39 | | 09- 23- 24 | 29- 15- 03 |
| 409 | 1868-12-14-01-33 | 17- 16- 27 | | 12- 00- 53 | 29- 17- 20 |
| 409 | 1930-12-20-01-24 | 17- 13- 36 | | 12- 03- 36 | 29- 17- 12 |
| 410 | 1869- 1-12-18-53 | 16- 06- 07 | | 13- 12- 54 | 29- 19- 01 |
| 410 | 1931- 1-18-18-36 | 16- 03- 24 | | 13- 15- 11 | 29- 18- 35 |
| 411 | 1869- 2-11-13-59 | 14- 23- 01 | | 14- 19- 47 | 29- 18- 48 |
| 411 | 1931- 2-17-13-11 | 14- 21- 49 | | 14- 20- 51 | 29- 18- 40 |
| 412 | 1869- 3-13-08-47 | 13- 16- 13 | | 16- 00- 48 | 29- 17- 01 |
| 412 | 1931- 3-19-07-51 | 13- 14- 09 | | 16- 03- 00 | 29- 17- 09 |
| 413 | 1869- 4-12-01-48 | 12- 05- 12 | | 17- 09- 07 | 29- 14- 19 |
| 413 | 1931- 4-18-01-00 | 12- 03- 00 | | 17- 11- 28 | 29- 14- 28 |

TABLE 1 CONTINUED

* * * * * * * *

| COLUMN A | COLUMN B | COLUMN C | COLUMN D | COLUMN E | COLUMN F |
|---|---|---|---|---|---|
| NUMBER | YEAR-MO-DA-HR-MIN | DAS-HRS-MIN | DAS-HRS | DAS-HRS-MIN | DAS-HRS-MIN |
| 414 | 1869- 5-11-16-07 | 10- 05- 53 | | 19- 05- 52 | 29- 11- 45 |
| 414 | 1931- 5-17-15-28 | 10- 00- 32 | | 19- 11- 02 | 29- 11- 34 |
| 415 | 1869- 6-10-03-52 | 06- 06- 08 | | 23- 03- 38 | 29- 09- 46 |
| 415 | 1931- 6-16-03-02 | 05- 21- 58 | | 23- 11- 20 | 29- 09- 18 |
| 416 * | 1869- 7-09-13-38 | 03- 03- 22 | | 26- 05- 08 | 29- 08- 30 |
| 416 * | 1931- 7-15-12-20 | 02- 23- 40 | | 26- 08- 27 | 29- 08- 07 |
| 417 | 1869- 8-07-22-08 | 01- 14- 52 | | 27- 17- 07 | (29- 07- 59) |
| 417 | 1931- 8-13-20-27 | 01- 13- 33 | | 27- 18- 26 | (29- 07- 59) |
| 418 | 1869- 9-06-06-07 | 00- 13- 53 | 28-11 | 00- 07- 20 | 29- 08- 13 |
| 418 | 1931- 9-12-04-26 | 00- 12- 34 | 28-12 | 00- 08- 06 | 29- 08- 40 |
| 419 | 1869-10-05-14-20 | 28- 03- 40 | | 01- 05- 36 | 29- 09- 16 |
| 419 | 1931-10-11-13-06 | 28- 01- 54 | | 01- 07- 55 | 29- 09- 49 |
| 420 | 1869-11-03-23-36 | 26- 21- 24 | | 02- 13- 41 | 29- 11- 05 |
| 420 | 1931-11-09-22-55 | 26- 19- 05 | | 02- 16- 16 | 29- 11- 21 |
| 421 | 1869-12-03-10-41 | 24- 08- 19 | | 05- 05- 05 | 29- 13- 24 |
| 421 | 1931-12-09-10-16 | 24- 00- 44 | | 05- 12- 29 | 29- 13- 13 |
| 422 | 1870- 1-02-00-05 | 19- 13- 55 | | 10- 01- 41 | 29- 15- 36 |
| 422 | 1932- 1-07-23-29 | 19- 09- 31 | | 10- 05- 45 | 29- 15- 16 |
| 423 | 1870- 1-31-15-41 | 17- 12- 19 | | 12- 04- 40 | (29- 16- 59) |
| 423 | 1932- 2-06-14-45 | 17- 11- 15 | | 12- 05- 44 | (29- 16- 59) |
| 424 | 1870- 3-02-08-40 | 16- 03- 20 | | 13- 13- 58 | 29- 17- 18 |
| 424 | 1932- 3-07-07-44 | 16- 01- 16 | | 13- 16- 21 | 29- 17- 37 |
| 425 | 1870- 4-01-01-58 | 14- 21- 02 | | 14- 19- 37 | 29- 16- 39 |
| 425 | 1932- 4-06-01-21 | 14- 18- 39 | | 14- 22- 12 | 29- 16- 51 |
| 426 | 1870- 4-30-18-37 | 13- 14- 23 | | 16- 00- 57 | 29- 15- 20 |
| 426 | 1932- 5-05-18-12 | 13- 11- 48 | | 16- 03- 16 | 29- 15- 04 |
| 427 | 1870- 5-30-09-57 | 12- 03- 03 | | 17- 10- 33 | 29- 13- 36 |
| 427 | 1932- 6-04-09-16 | 12- 00- 44 | | 17- 12- 20 | 29- 13- 04 |
| 428 | 1870- 6-28-23-33 | 10- 03- 27 | | 19- 08- 18 | 29- 11- 45 |
| 428 | 1932- 7-03-22-20 | 10- 00- 40 | | 19- 10- 42 | 29- 11- 22 |
| 429 * | 1870- 7-28-11-18 | 06- 02- 42 | | 23- 07- 26 | 29- 10- 08 |
| 429 * | 1932- 8-02-09-42 | 05- 22- 18 | | 23- 11- 55 | 29- 10- 13 |
| 430 | 1870- 8-26-21-26 | 03- 01- 34 | | 26- 07- 34 | 29- 09- 08 |
| 430 | 1932- 8-31-19-55 | 02- 23- 05 | | 26- 10- 30 | 29- 09- 35 |
| 431 | 1870- 9-25-06-34 | 01- 13- 26 | | 27- 19- 36 | 29- 09- 02 |
| 431 | 1932- 9-30-05-30 | 01- 11- 30 | | 27- 21- 56 | 29- 09- 26 |
| 432 | 1870-10-24-15-36 | 00- 12- 24 | 28-13 | 00- 08- 21 | 29- 09- 45 |
| 432 | 1932-10-29-14-56 | 00- 11- 04 | 28-13 | 00- 09- 43 | 29- 09- 47 |
| 433 | 1870-11-23-01-21 | 28- 02- 39 | | 01- 08- 19 | 29- 10- 58 |
| 433 | 1932-11-28-00-43 | 28- 01- 17 | | 01- 09- 22 | 29- 10- 39 |
| | | 1871-1-18-06 | | | |
| 434 | 1870-12-22-12-19 | 26- 17- 41 | | 02- 18- 32 | 29- 12- 13 |
| 434 | 1932-12-27-11-22 | 26- 15- 38 | | 02- 20- 20 | 29- 11- 58 |
| | | 1933-1-23-03 | | | |
| 435 | 1871- 1-21-00-32 | 23- 18- 28 | | 05- 18- 49 | 29- 13- 17 |
| 435 | 1933- 1-25-23-20 | 23- 11- 40 | | 06- 01- 44 | 29- 13- 24 |
| 436 | 1871- 2-19-13-49 | 19- 08- 11 | | 10- 06- 00 | 29- 14- 11 |
| 436 | 1933- 2-24-12-44 | 19- 05- 16 | | 10- 09- 20 | 29- 14- 36 |
| 437 | 1871- 3-21-04-00 | 17- 10- 00 | | 12- 05- 03 | 29- 15- 03 |
| 437 | 1933- 3-26-03-20 | 17- 07- 40 | | 12- 07- 38 | 29- 15- 18 |
| 438 | 1871- 4-19-19-03 | 16- 00- 57 | | 13- 14- 45 | 29- 15- 42 |
| 438 | 1933- 4-24-18-38 | 15- 23- 22 | | 13- 16- 07 | 29- 15- 29 |
| 439 | 1871- 5-19-10-45 | 14- 19- 15 | | 14- 20- 29 | 29- 15- 44 |
| 439 | 1933- 5-24-10-07 | 14- 16- 53 | | 14- 22- 22 | 29- 15- 15 |
| 440 | 1871- 6-18-02-29 | 13- 12- 31 | | 16- 02- 27 | 29- 14- 58 |
| 440 | 1933- 6-23-01-22 | 13- 10- 38 | | 16- 04- 03 | 29- 14- 41 |
| 441 | 1871- 7-17-17-27 | 12- 02- 33 | | 17- 11- 02 | 29- 13- 35 |
| 441 | 1933- 7-22-16-03 | 12- 00- 57 | | 17- 12- 48 | 29- 13- 45 |
| 442 * | 1871- 8-16-07-02 | 10- 03- 58 | | 19- 08- 10 | 29- 12- 08 |
| 442 * | 1933- 8-21-05-48 | 10- 00- 12 | | 19- 12- 21 | 29- 12- 33 |
| 443 | 1871- 9-14-19-10 | 05- 23- 50 | | 23- 11- 19 | 29- 11- 09 |
| 443 | 1933- 9-19-18-21 | 05- 16- 39 | | 23- 18- 45 | 29- 11- 24 |
| 444 | 1871-10-14-06-19 | 02- 21- 41 | | 26- 13- 09 | 29- 10- 50 |
| 444 | 1933-10-19-05-45 | 02- 18- 15 | | 26- 16- 24 | 29- 10- 39 |
| 445 | 1871-11-12-17-09 | 01- 10- 51 | | 28- 00- 02 | 29- 10- 53 |
| 445 | 1933-11-17-16-24 | 01- 08- 36 | | 28- 01- 53 | 29- 10- 29 |
| 446 | 1871-12-12-04-02 | (00- 10- 58) | 28-13 | (00- 10- 58) | 29- 10- 56 |
| 446 | 1933-12-17-02-53 | 00- 09- 07 | 28:13 | 00- 12- 37 | 29- 10- 44 |
| 447 | 1872- 1-10-14-58 | 28- 00- 02 | | 01- 10- 52 | 29- 10- 54 |
| 447 | 1934- 1-15-13-37 | 27- 21- 23 | | 01- 13- 43 | 29- 11- 06 |
| 448 | 1872- 2-09-01-52 | 26- 12- 08 | | 02- 22- 53 | 29- 11- 01 |
| 448 | 1934- 2-14-00-43 | 26- 09- 17 | | 03- 02- 08 | 29- 11- 25 |
| 449 | 1872- 3-09-12-53 | 23- 08- 07 | | 06- 03- 32 | 29- 11- 39 |
| 449 | 1934- 3-15-12-08 | 22- 22- 52 | | 06- 12- 57 | 29- 11- 49 |

| COLUMN A | COLUMN B | COLUMN C | COLUMN D | COLUMN E | COLUMN F |
|---|---|---|---|---|---|
| NUMBER | YEAR-MO-DA-HR-MIN | DAS-HRS-MIN | DAS-HRS | DAS-HRS-MIN | DAS-HRS-MIN |
| 450 | 1872- 4-08-00-32 | 19- 06- 28 | | 10- 06- 19 | 29- 12- 47 |
| 450 | 1934- 4-13-23-57 | 19- 02- 03 | | 10- 10- 30 | 29- 12- 33 |
| 451 | 1872- 5-07-13-19 | 17- 09- 41 | | 12- 04- 23 | 29- 14- 04 |
| 451 | 1934- 5-13-12-30 | 17- 06- 30 | | 12- 07- 12 | 29- 13- 42 |
| 452 | 1872- 6-06-03-23 | 16- 00- 37 | | 13- 14- 25 | 29- 15- 02 |
| 452 | 1934- 6-12-02-12 | 15- 22- 48 | | 13- 16- 06 | 29- 14- 54 |
| 453 | 1872- 7-05-18-25 | 14- 18- 35 | | 14- 20- 46 | 29- 15- 21 |
| 453 | 1934- 7-11-17-06 | 14- 16- 54 | | 14- 22- 46 | 29- 15- 40 |
| 454 | 1872- 8-04-09-46 | 13- 13- 14 | | 16- 01- 54 | 29- 15- 08 |
| 454 | 1934- 8-10-08-46 | 13- 11- 14 | | 16- 04- 20 | 29- 15- 34 |
| 455 * | 1872- 9-03-00-54 | 12- 03- 06 | | 17- 11- 31 | 29- 14- 37 |
| 455 * | 1934- 9-09-00-20 | 12- 00- 40 | | 17- 14- 05 | 29- 14- 45 |
| 456 | 1872-10-02-15-31 | 10- 03- 29 | | 19- 10- 28 | 29- 13- 57 |
| 456 | 1934-10-08-15-05 | 09- 22- 55 | | 19- 14- 44 | 29- 13- 39 |
| 457 | 1872-11-01-05-28 | 05- 15- 32 | | 23- 21- 35 | 29- 13- 07 |
| 457 | 1934-11-07-04-44 | 05- 08- 16 | | 24- 04- 25 | 29- 12- 41 |
| 458 | 1872-11-30-18-35 | 02- 17- 25 | | 26- 18- 36 | 29- 12- 01 |
| 458 | 1934-12-06-17-25 | 02- 14- 35 | | 26- 21- 20 | 29- 11- 55 |
| 459 | 1872-12-30-06-36 | 01- 07- 24 | | 28- 03- 27 | 29- 10- 51 |
| 459 | 1935- 1-05-05-20 | 01- 06- 40 | | 28- 04- 27 | 29- 11- 07 |
| 460 | 1873- 1-28-17-27 | 00- 08- 33 | 28-12 | 00- 13- 22 | 29- 09- 55 |
| 460 | 1935- 2-03-16-27 | 00- 06- 33 | 28-13 | 00- 14- 40 | 29- 10- 13 |
| 461 | 1873- 2-27-03-22 | 27- 19- 38 | | 01- 13- 54 | 29- 09- 32 |
| 461 | 1935- 3-05-02-40 | 27- 17- 20 | | 01- 16- 11 | 29- 09- 31 |
| 462 | 1873- 3-28-12-54 | 26- 07- 06 | | 03- 02- 42 | 29- 09- 48 |
| 462 | 1935- 4-03-12-11 | 26- 03- 49 | | 03- 05- 36 | 29- 09- 25 |
| 463 | 1873- 4-26-22-42 | 23- 01- 18 | | 06- 09- 20 | 29- 10- 38 |
| 463 | 1935- 5-02-21-36 | 22- 19- 24 | | 06- 14- 52 | 29- 10- 16 |
| 464 | 1873- 5-26-09-20 | 19- 04- 40 | | 10- 07- 12 | 29- 11- 52 |
| 464 | 1935- 6-01-07-52 | 19- 02- 08 | | 10- 09- 45 | 29- 11- 53 |
| 465 | 1873- 6-24-21-12 | 17- 07- 48 | | 12- 05- 34 | 29- 13- 22 |
| 465 | 1935- 6-30-19-45 | 17- 07- 15 | | 12- 06- 32 | 29- 13- 47 |
| 466 | 1873- 7-24-10-34 | 16- 00- 26 | | 13- 14- 30 | 29- 14- 56 |
| 466 | 1935- 7-30-09-32 | 15- 22- 28 | | 13- 17- 00 | 29- 15- 28 |
| 467 | 1873- 8-23-01-30 | 14- 18- 30 | | 14- 21- 51 | 29- 16- 21 |
| 467 | 1935- 8-29-01-00 | 14- 17- 00 | | 14- 23- 29 | 29- 16- 29 |
| 468 * | 1873- 9-21-17-51 | 13- 13- 09 | | 16- 03- 55 | 29- 17- 04 |
| 468 * | 1935- 9-27-17-29 | 13- 11- 31 | | 16- 05- 15 | 29- 16- 46 |
| 469 | 1873-10-21-10-55 | 12- 02- 05 | | 17- 14- 37 | 29- 16- 42 |
| 469 | 1935-10-27-10-15 | 12- 00- 45 | | 17- 15- 36 | 29- 16- 21 |
| 470 | 1873-11-20-03-37 | 09- 23- 23 | | 19- 15- 49 | 29- 15- 12 |
| 470 | 1935-11-26-02-36 | 09- 19- 24 | | 19- 19- 49 | 29- 15- 13 |
| 471 | 1873-12-19-18-49 | 05- 02- 11 | | 24- 11- 00 | 29- 13- 11 |
| 471 | 1935-12-25-17-49 | 04- 21- 11 | | 24- 16- 18 | 29- 13- 29 |
| 472 | 1874- 1-18-08-00 | 02- 13- 00 | | 26- 22- 15 | 29- 11- 15 |
| 472 | 1936- 1-24-07-18 | 02- 10- 42 | | 27- 00- 42 | 29- 11- 24 |
| 473 | 1874- 2-16-19-15 | 01- 05- 45 | | 28- 04- 02 | 29- 09- 47 |
| 473 | 1936- 2-22-18-42 | 01- 03- 18 | | 28- 06- 14 | 29- 09- 32 |
| 474 | 1874- 3-18-05-02 | 00- 06- 58 | 28-11 | 00- 14- 52 | 29- 08- 50 |
| 474 | 1936- 3-23-04-14 | 00- 04- 46 | 28-11 | 00- 16- 33 | 29- 08- 19 |
| 475 | 1874- 4-16-13-52 | 27- 16- 08 | | 01- 16- 17 | 29- 08- 25 |
| 475 | 1936- 4-21-12-33 | 27- 14- 27 | | 01- 17- 35 | 29- 08- 02 |
| 476 | 1874- 5-15-22-17 | 26- 03- 43 | | 03- 04- 52 | 29- 08- 35 |
| 476 | 1936- 5-20-20-35 | 26- 00- 25 | | 03- 08- 15 | 29- 08- 40 |
| 477 | 1874- 6-14-06-52 | 22- 22- 08 | | 06- 11- 28 | 29- 09- 36 |
| 477 | 1936- 6-19-05-15 | 22- 15- 45 | | 06- 18- 19 | 29- 10- 04 |
| 478 | 1874- 7-13-16-28 | 19- 03- 32 | | 10- 08- 00 | 29- 11- 32 |
| 478 | 1936- 7-18-15-19 | 19- 00- 41 | | 10- 11- 21 | 29- 12- 02 |
| 479 | 1874- 8-12-04-00 | 17- 08- 00 | | 12- 06- 10 | 29- 14- 10 |
| 479 | 1936- 8-17-03-21 | 17- 05- 39 | | 12- 08- 41 | 29- 14- 20 |
| 480 | 1874- 9-10-18-10 | 15- 23- 50 | | 13- 17- 02 | 29- 16- 52 |
| 480 | 1936- 9-15-17-41 | 15- 21- 19 | | 13- 19- 20 | 29- 16- 39 |
| 481 * | 1874-10-10-11-02 | 14- 18- 58 | | 14- 23- 34 | 29- 18- 32 |
| 481 * | 1936-10-15-10-20 | 14- 16- 40 | | 15- 01- 42 | 29- 18- 22 |
| 482 | 1874-11-09-05-34 | 13- 12- 26 | | 16- 06- 06 | 29- 18- 32 |
| 482 | 1936-11-14-04-42 | 13- 09- 18 | | 16- 09- 25 | 29- 18- 43 |
| 483 | 1874-12-09-00-06 | 11- 23- 54 | | 17- 17- 08 | 29- 17- 02 |
| 483 | 1936-12-13-23-25 | 11- 21- 35 | | 17- 19- 47 | 29- 17- 22 |
| 484 | 1875- 1-07-17-08 | 09- 17- 52 | | 19- 20- 55 | (29- 14- 47) |
| 484 | 1937- 1-12-16-47 | 09- 10- 13 | | 20- 04- 34 | (29- 14- 47) |
| 485 | 1875- 2-06-07-55 | 04- 18- 05 | | 24- 18- 20 | 29- 12- 25 |
| 485 | 1937- 2-11-07-34 | 04- 18- 26 | | 24- 23- 32 | 29- 11- 58 |

TABLE 1 CONTINUED

* * * * * * * *

| COLUMN A NUMBER | COLUMN B YEAR-MO-DA-HR-MIN | COLUMN C DAS-HRS-MIN | COLUMN D DAS-HRS | COLUMN E DAS-HRS-MIN | COLUMN F DAS-HRS-MIN |
|---|---|---|---|---|---|
| 486 | 1875- 3-07-20-20 | 02- 09- 40 | | 27- 00- 36 | 29- 10- 16 |
| 486 | 1937- 3-12-19-32 | 02- 07- 28 | | 27- 02- 10 | 29- 09- 38 |
| 487 | 1875- 4-06-06-36 | 01- 04- 24 | | 28- 04- 04 | 29- 08- 28 |
| 487 | 1937- 4-11-05-10 | 01- 02- 50 | | 28- 05- 18 | 29- 08- 08 |
| 488 | 1875- 5-05-15-04 | 08- 05- 56 | 28-09 | 00- 16- 21 | 29- 07- 17 |
| 488 | 1937- 5-10-13-18 | 00- 04- 42 | 28-09 | 00- 17- 43 | 29- 07- 25 |
| 489 | 1875- 6-03-22-21 | 27- 14- 39 | | 01- 16- 25 | 29- 07- 04 |
| 489 | 1937- 6-08-20-43 | 27- 12- 17 | | 01- 19- 13 | 29- 07- 30 |
| 490 | 1875- 7-03-05-25 | 26- 03- 35 | | 03- 04- 28 | 29- 08- 03 |
| 490 | 1937- 7-08-04-13 | 25- 23- 47 | | 03- 08- 37 | 29- 08- 24 |
| 491 | 1875- 8-01-13-28 | 22- 22- 32 | | 06- 11- 41 | 29- 10- 13 |
| 491 | 1937- 8-06-12-37 | 22- 14- 23 | | 06- 19- 54 | 29- 10- 17 |
| 492 | 1875- 8-30-23-41 | 19- 02- 19 | | 10- 10- 55 | 29- 13- 14 |
| 492 | 1937- 9-04-22-54 | 18- 22- 06 | | 10- 14- 58 | 29- 13- 04 |
| 493 | 1875- 9-29-12-55 | 17- 07- 05 | | 12- 09- 13 | (29- 16- 18) |
| 493 | 1937-10-04-11-58 | 17- 04- 02 | | 12- 12- 16 | (29- 16- 18) |
| 494 * | 1875-10-29-05-13 | 15- 21- 47 | | 13- 20- 44 | 29- 18- 31 |
| 494 * | 1937-11-03-04-16 | 15- 20- 44 | | 13- 22- 11 | 29- 18- 55 |
| 495 | 1875-11-27-23-44 | 14- 16- 16 | | 15- 03- 04 | 29- 19- 20 |
| 495 | 1937-12-02-23-11 | 14- 14- 49 | | 15- 04- 58 | 29- 19- 47 |
| 496 | 1875-12-27-19-04 | 13- 08- 56 | | 16- 09- 41 | (29- 18- 37) |
| 496 | 1938- 1-01-18-58 | 13- 07- 02 | | 16- 11- 35 | (29- 18- 37) |
| 497 | 1876- 1-26-13-41 | 11- 20- 19 | | 17- 20- 20 | 29- 16- 39 |
| 497 | 1938- 1-31-13-35 | 11- 16- 25 | | 17- 23- 40 | 29- 16- 05 |
| 498 | 1876- 2-25-06-20 | 09- 07- 40 | | 20- 06- 12 | 29- 13- 52 |
| 498 | 1938- 3-02-05-40 | 09- 02- 20 | | 20- 10- 52 | 29- 13- 12 |
| 499 | 1876- 3-25-20-12 | 04- 13- 48 | | 24- 21- 03 | 29- 10- 51 |
| 499 | 1938- 3-31-18-52 | 04- 09- 08 | | 25- 01- 28 | 29- 10- 36 |
| 500 | 1876- 4-24-07-03 | 02- 08- 57 | | 26- 23- 25 | 29- 08- 22 |
| 500 | 1938- 4-30-05-28 | 02- 07- 32 | | 27- 01- 00 | 29- 08- 32 |
| 501 | 1876- 5-23-15-25 | 01- 03- 35 | | 28- 03- 17 | 29- 06- 52 |
| 501 | 1938- 5-29-14-00 | 01- 03- 00 | | 28- 04- 10 | 29- 07- 10 |
| 502 | 1876- 6-21-22-17 | 00- 05- 43 | 28-09 | 00- 15- 53 | 29- 06- 36 |
| 502 | 1938- 6-27-21-10 | 00- 03- 50 | 28-10 | 00- 16- 54 | 29- 06- 44 |
| 503 | 1876- 7-21-04-53 | 27- 15- 07 | | 01- 16- 26. | 29- 07- 33 |
| 503 | 1938- 7-27-03-54 | 27- 13- 06 | | 01- 18- 17 | 29- 07- 23 |
| 504 | 1876- 8-19-12-26 | 26- 03- 34 | | 03- 05- 54 | 29- 09- 28 |
| 504 | 1938- 8-25-11-17 | 26- 00- 43 | | 03- 08- 34 | 29- 09- 17 |
| 505 | 1876- 9-17-21-54 | 22- 17- 06 | | 06- 18- 57 | 29- 12- 03 |
| 505 | 1938- 9-23-20-34 | 22- 11- 26 | | 07- 00- 42 | 29- 12- 08 |
| 506 | 1876-10-17-09-57 | 18- 21- 03 | | 10- 17- 48 | 29- 14- 51 |
| 506 | 1938-10-23-08-42 | 18- 19- 18 | | 10- 20- 05 | 29- 15- 23 |
| 507 * | 1876-11-16-00-48 | 17- 03- 12 | | 12- 14- 14 | 29- 17- 26 |
| 507 * | 1938-11-22-00-05 | 17- 00- 55 | | 12- 17- 07 | 29- 18- 02 |
| 508 | 1876-12-15-18-14 | 15- 18- 46 | | 14- 00- 28 | 29- 19- 14 |
| 508 | 1938-12-21-18-07 | 15- 16- 53 | | 14- 02- 27 | 29- 19- 20 |
| 509 | 1877- 1-14-13-28 | 14- 13- 32 | | 15- 05- 59 | 29- 19- 31 |
| 509 | 1939- 1-20-13-27 | 14- 10- 33 | | 15- 08- 28 | 29- 19- 01 |
| 510 | 1877- 2-13-08-59 | 13- 05- 01 | | 16- 12- 54 | 29- 17- 55 |
| 510 | 1939- 2-19-08-28 | 13- 02- 32 | | 16- 14- 49 | 29- 17- 21 |
| 511 | 1877- 3-15-02-54 | 11- 14- 06 | | 18- 00- 50 | 29- 14- 56 |
| 511 | 1939- 3-21-01-49 | 11- 11- 11 | | 18- 03- 35 | 29- 14- 46 |
| 512 | 1877- 4-13-17-50 | 09- 00- 10 | | 20- 11- 29 | 29- 11- 39 |
| 512 | 1939- 4-19-16-35 | 08- 17- 25 | | 20- 18- 25 | 29- 11- 50 |
| 513 | 1877- 5-13-05-29 | 04- 11- 31 | | 24- 21- 32 | 29- 09- 03 |
| 513 | 1939- 5-19-04-25 | 04- 07- 35 | | 25- 01- 37 | 29- 09- 12 |
| 514 | 1877- 6-11-14-32 | 02- 09- 28 | | 26- 22- 06 | 29- 07- 34 |
| 514 | 1939- 6-17-13-37 | 02- 06- 23 | | 27- 01- 03 | 29- 07- 26 |
| 515 | 1877- 7-10-22-06 | 01- 03- 54 | | 28- 03- 17 | 29- 07- 11 |
| 515 | 1939- 7-16-21-03 | 01- 01- 57 | | 28- 04- 53 | 29- 06- 50 |
| 516 | 1877- 8-09-05-17 | 00- 05- 43 | 28-10 | 00- 16- 00 | 29- 07- 43 |
| 516 | 1939- 8-15-03-23 | 00- 04- 07 | 28-10 | 00- 17- 22 | 29- 07- 29 |
| 517 | 1877- 9-07-13-00 | 27- 16- 00 | | 01- 16- 58 | 29- 08- 58 |
| 517 | 1939- 9-13-11-22 | 27- 13- 38 | | 01- 19- 30 | 29- 09- 08 |
| 518 | 1877-10-06-21-58 | 26- 04- 02 | | 03- 06- 48 | 29- 10- 50 |
| 518 | 1939-10-12-20-30 | 26- 00- 30 | | 03- 10- 54 | 29- 11- 24 |
| 519 | 1877-11-05-08-48 | 22- 09- 12 | | 07- 04- 04 | 29- 13- 16 |
| 519 | 1939-11-11-07-54 | 21- 23- 06 | | 07- 14- 45 | 29- 13- 51 |
| 520 * | 1877-12-04-22-04 | 18- 15- 56 | | 11- 00- 03 | 29- 15- 59 |
| 520 * | 1939-12-10-21-45 | 18- 13- 15 | | 11- 02- 53 | 29- 16- 08 |
| 521 | 1878- 1-03-14-03 | 16- 23- 57 | | 12- 18- 17 | 29- 18- 14 |
| 521 | 1940- 1-09-13-53 | 16- 21- 07 | | 12- 20- 45 | 29- 17- 52 |
| 522 | 1878- 2-02-08-17 | 15- 16- 43 | | 14- 02- 18 | 29- 19- 01 |
| 522 | 1940- 2-08-07-45 | 15- 14- 15 | | 14- 04- 23 | 29- 18- 38 |
| 523 | 1878- 3-04-03-18 | 14- 09- 42 | | 15- 08- 14 | 29- 17- 56 |
| 523 | 1940- 3-09-02-23 | 14- 07- 37 | | 15- 10- 18 | 29- 17- 55 |
| 524 | 1878- 4-02-21-14 | 13- 01- 46 | | 16- 13- 50 | 29- 15- 36 |
| 524 | 1940- 4-07-20-18 | 12- 22- 42 | | 16- 17- 07 | 29- 15- 49 |
| 525 | 1878- 5-02-12-50 | 11- 11- 10 | | 18- 01- 48 | (29- 12- 58) |
| 525 | 1940- 5-07-12-07 | 11- 06- 53 | | 18- 06- 05 | (29- 12- 58) |
| 526 | 1878- 6-01-01-48 | 08- 21- 12 | | 20- 13- 31 | 29- 10- 43 |
| 526 | 1940- 6-06-01-05 | 08- 130 55 | | 20- 20- 28 | 29- 10- 23 |
| 527 | 1878- 6-30-12-31 | 04- 12- 29 | | 24- 20- 40 | 29- 09- 09 |
| 527 | 1940- 7-05-11-28 | 04- 07- 32 | | 25- 01- 09 | 29- 08- 41 |
| 528 | 1878- 7-29-21-40 | 02- 09- 20 | | 26- 23- 00 | 29- 08- 20 |
| 528 | 1940- 8-03-20-09 | 02- 06- 51 | | 27- 01- 15 | 29- 08- 06 |
| 529 | 1878- 8-28-06-00 | 01- 03- 00 | | 28- 05- 10 | 29- 08- 10 |
| 529 | 1940- 9-02-04-15 | 01- 01- 45 | | 28- 06- 41 | 29- 08- 26 |
| 530 | 1878- 9-26-14-10 | 00- 04- 50 | 28-11 | 00- 16- 58 | 29- 08- 48 |
| 530 | 1940-10-01-12-41 | 00- 03- 19 | 28-12 | 00- 18- 03 | 29- 09- 22 |
| 531 | 1878-10-25-22-58 | 27- 16- 02 | | 01- 18- 11 | 29- 10- 13 |
| 531 | 1940-10-30-22-03 | 27- 13- 57 | | 01- 20- 42 | 29- 10- 39 |
| 532 | 1878-11-24-09-11 | 26- 01- 49 | | 03- 10- 24 | 29- 12- 13 |
| 532 | 1940-11-29-08-42 | 25- 21- 18 | | 03- 14- 56 | 29- 12- 14 |
| 533 * | 1878-12-23-21-24 | 21- 18- 36 | | 07- 19- 51 | 29- 14- 27 |
| 533 * | 1940-12-28-20-56 | 21- 11- 04 | | 08- 03- 03 | 29- 14- 07 |
| 534 | 1879- 1-22-11-51 | 18- 12- 09 | | 11- 04- 03 | 29- 16- 12 |
| 534 | 1941- 1-27-11-03 | 18- 08- 57 | | 11- 07- 02 | 29- 15- 59 |
| 535 | 1879- 2-21-04-03 | 16- 20- 57 | | 12- 20- 04 | 29- 17- 01 |
| 535 | 1941- 2-26-03-02 | 16- 18- 58 | | 12- 22- 14 | 29- 17- 12 |
| 536 | 1879- 3-22-21-04 | 15- 12- 56 | | 14- 03- 56 | 29- 16- 52 |
| 536 | 1941- 3-27-20-14 | 15- 11- 46 | | 14- 05- 23 | 29- 17- 09 |
| 537 | 1879- 4-21-13-56 | 14- 07- 04 | | 15- 08- 50 | 29- 15- 54 |
| 537 | 1941- 4-26-13-23 | 14- 05- 37 | | 15- 10- 18 | 29- 15- 55 |
| 538 | 1879- 5-21-05-50 | 12- 23- 10 | | 16- 15- 20 | 29- 14- 30 |
| 538 | 1941- 5-26-05-18 | 12- 20- 42 | | 16- 17- 22 | 29- 14- 04 |
| 539 | 1879- 6-19-20-20 | 11- 09- 40 | | 18- 03- 06 | 29- 12- 46 |
| 539 | 1941- 6-24-19-22 | 11- 06- 38 | | 18- 05- 39 | 29- 12- 17 |
| 540 | 1879- 7-19-09-06 | 08- 18- 54 | | 20- 16- 11 | 29- 11- 05 |
| 540 | 1941- 7-24-07-39 | 08- 14- 21 | | 20- 20- 34 | 29- 10- 55 |
| 541 | 1879- 8-17-20-11 | 04- 09- 49 | | 24- 23- 57 | 29- 09- 46 |
| 541 | 1941- 8-22-18-34 | 04- 06- 26 | | 25- 03- 38 | 29- 10- 04 |
| 542 | 1879- 9-16-05-57 | 02- 07- 03 | | 27- 02- 09 | 29- 09- 12 |
| 542 | 1941- 9-21-04-38 | 02- 05- 22 | | 27- 04- 20 | 29- 09- 42 |
| 543 | 1879-10-15-15-09 | 01- 01- 51 | | 28- 07- 38 | 29- 09- 29 |
| 543 | 1941-10-20-14-20 | 00- 23- 40 | | 28- 10- 04 | 29- 09- 44 |
| 544 | 1879-11-14-00-38 | 00- 03- 22 | 28-13 | 00- 18- 04 | 29- 10- 26 |
| 544 | 1941-11-19-00-04 | 00- 01- 56 | 28-12 | 00- 20- 18 | 29- 10- 14 |
| 545 | 1879-12-13-11-04 | 27- 13- 56 | 1880-1-10-01 | 01- 21- 40 | 29- 11- 36 |
| 545 | 1941-12-18-10-18 | 27- 11- 42 | 1942-1-14-22 | 01- 23- 32 | 29- 11- 14 |
| 546 * | 1880- 1-11-22-40 | 25- 19- 20 | | 03- 17- 17 | 29- 12- 37 |
| 546 * | 1942- 1-16-21-32 | 25- 14- 28 | | 03- 22- 02 | 29- 12- 30 |
| 547 | 1880- 2-10-11-17 | 21- 06- 43 | | 08- 06- 47 | 29- 13- 30 |
| 547 | 1942- 2-15-10-02 | 21- 00- 58 | | 08- 12- 50 | 29- 13- 48 |
| 548 | 1880- 3-11-00-47 | 18- 08- 13 | | 11- 06- 07 | 29- 14- 20 |
| 548 | 1942- 3-16-23-50 | 18- 06- 10 | | 11- 08- 33 | 29- 14- 43 |
| 549 | 1880- 4-09-15-07 | 16- 18- 53 | | 12- 20- 16 | 29- 15- 09 |
| 549 | 1942- 4-15-14-33 | 16- 16- 27 | | 12- 22- 45 | 29- 15- 12 |
| 550 | 1880- 5-09-06-16 | 15- 11- 44 | | 14- 03- 55 | 29- 15- 39 |
| 550 | 1942- 5-15-05-45 | 15- 10- 15 | | 14- 05- 02 | 29- 15- 17 |
| 551 | 1880- 6-07-21-55 | 14- 06- 05 | | 15- 09- 21 | 29- 15- 26 |
| 551 | 1942- 6-13-21-02 | 14- 03- 58 | | 15- 11- 03 | 29- 15- 01 |
| 552 | 1880- 7-07-13-21 | 12- 22- 39 | | 16- 15- 48 | 29- 14- 27 |
| 552 | 1942- 7-13-12-03 | 12- 20- 57 | | 16- 17- 28 | 29- 14- 25 |
| 553 | 1880- 8-06-03-48 | 11- 09- 12 | | 18- 03- 52 | 29- 13- 04 |
| 553 | 1942- 8-12-02-28 | 11- 06- 32 | | 18- 06- 53 | 29- 13- 25 |
| 554 | 1880- 9-04-16-52 | 08- 18- 08 | | 20- 17- 43 | 29- 11- 51 |
| 554 | 1942- 9-10-15-53 | 08- 11- 07 | | 21- 01- 06 | 29- 12- 13 |
| 555 | 1880-10-04-04-43 | 04- 06- 17 | | 25- 04- 55 | 29- 11- 12 |
| 555 | 1942-10-10-04-06 | 04- 00- 54 | | 25- 10- 19 | 29- 11- 13 |
| 556 | 1880-11-02-15-55 | 02- 04- 05 | | 27- 06- 56 | 29- 11- 01 |
| 556 | 1942-11-08-15-19 | 02- 01- 41 | | 27- 08- 59 | 29- 10- 40 |
| 557 | 1880-12-02-02-56 | 00- 23- 04 | | 28- 11- 56 | 29- 11- 00 |
| 557 | 1942-12-08-01-59 | 00- 22- 01 | 28-12 | 00- 00- 37 | 29- 10- 38 |

TABLE 1 CONTINUED

* * * * * * * *

| COLUMN A<br>NUMBER | COLUMN B<br>YEAR-MO-DA-HR-MIN | COLUMN C<br>DAS-HRS-MIN | COLUMN D<br>DAS-HRS | COLUMN E<br>DAS-HRS-MIN | COLUMN F<br>DAS-HRS-MIN |
|---|---|---|---|---|---|
| 558 | 1880-12-31-13-56 | 00- 01- 04 | 28-13 | 00- 20- 48 | (29- 10- 52) |
| 558 | 1943- 1-06-12-37 | 28- 11- 23 | | 00- 23- 29 | (29- 10- 52) |
| 559 * | 1881- 1-30-00-48 | 27- 09- 12 | | 02- 01- 32 | 29- 10- 44 |
| 559 * | 1943- 2-04-23-29 | 27- 07- 31 | | 02- 03- 34 | 29- 11- 05 |
| 560 | 1881- 2-28-11-32 | 25- 11- 28 | | 03- 23- 32 | 29- 11- 00 |
| 560 | 1943- 3-06-10-34 | 25- 06- 26 | | 04- 04- 53 | 29- 11- 19 |
| 561 | 1881- 3-29-22-32 | 21- 01- 28 | | 08- 10- 24 | 29- 11- 52 |
| 561 | 1943- 4-04-21-53 | 20- 18- 07 | | 08- 17- 43 | 29- 11- 50 |
| 562 | 1881- 4-28-10-24 | 18- 07- 36 | | 11- 05- 36 | 29- 13- 12 |
| 562 | 1943- 5-04-09-43 | 18- 04- 17 | | 11- 08- 33 | 29- 12- 50 |
| 563 | 1881- 5-27-23-36 | 16- 18- 24 | | 12- 20- 04 | 29- 14- 28 |
| 563 | 1943- 6-02-22-33 | 16- 16- 27 | | 12- 21- 44 | 29- 14- 11 |
| 564 | 1881- 6-26-14-04 | 15- 11- 56 | | 14- 03- 19 | 29- 15- 15 |
| 564 | 1943- 7-02-12-44 | 15- 09- 16 | | 14- 06- 06 | 29- 15- 22 |
| 565 | 1881- 7-26-05-19 | 14- 05- 41 | | 15- 09- 45 | 29- 15- 26 |
| 565 | 1943- 8-01-04-06 | 14- 03- 54 | | 15- 11- 59 | 29- 15- 53 |
| 566 | 1881- 8-24-20-45 | 12- 23- 15 | | 16- 15- 55 | 29- 15- 10 |
| 566 | 1943- 8-30-19-59 | 12- 21- 01 | | 16- 18- 29 | 29- 15- 30 |
| 567 | 1881- 9-23-11-55 | 11- 10- 05 | | 18- 04- 31 | 29- 14- 36 |
| 567 | 1943- 9-29-11-29 | 11- 06- 31 | | 18- 07- 59 | 29- 14- 30 |
| 568 | 1881-10-23-02-31 | 08- 15- 29 | | 20- 22- 21 | 29- 13- 50 |
| 568 | 1943-10-29-01-59 | 08- 08- 01 | | 21- 05- 23 | 29- 13- 24 |
| 569 | 1881-11-21-16-21 | 03- 22- 39 | | 25- 14- 07 | 29- 12- 46 |
| 569 | 1943-11-27-15-23 | 03- 18- 37 | | 25- 17- 50 | 29- 12- 27 |
| 570 | 1881-12-21-05-07 | 01- 23- 53 | | 27- 11- 35 | 29- 11- 28 |
| 570 | 1943-12-27-03-50 | 01- 22- 10 | | 27- 13- 24 | 29- 11- 34 |
| 571 | 1882- 1-19-16-35 | 00- 20- 25 | 28-13 | 00- 00- 50 | 29- 10- 15 |
| 571 | 1944- 1-25-15-24 | 00- 19- 36 | 28-12 | 00- 02- 59 | 29- 10- 35 |
| 572 * | 1882- 2-18-02-50 | 28- 10- 10 | | 00- 23- 17 | 29- 09- 27 |
| 572 * | 1944- 2-24-01-59 | 28- 08- 01 | | 01- 01- 36 | 29- 09- 37 |
| 573 | 1882- 3-19-12-17 | 27- 04- 43 | | 02- 04- 38 | 29- 09- 21 |
| 573 | 1944- 3-24-11-36 | 27- 02- 24 | | 02- 06- 43 | 29- 09- 07 |
| 574 | 1882- 4-17-21-38 | 25- 05- 22 | | 04- 04- 33 | 29- 09- 55 |
| 574 | 1944- 4-22-20-43 | 25- 01- 17 | | 04- 08- 12 | 29- 09- 29 |
| 575 | 1882- 5-17-07-33 | 20- 22- 27 | | 08- 12- 33 | 29- 11- 00 |
| 575 | 1944- 5-22-06-12 | 20- 17- 48 | | 08- 17- 00 | 29- 10- 48 |
| 576 | 1882- 6-15-18-33 | 18- 06- 27 | | 11- 06- 01 | 29- 12- 28 |
| 576 | 1944- 6-20-17-00 | 18- 05- 00 | | 11- 07- 42 | 29- 12- 42 |
| 577 | 1882- 7-15-07-01 | 16- 16- 59 | | 12- 21- 10 | 29- 14- 09 |
| 577 | 1944- 7-20-05-42 | 16- 16- 18 | | 12- 22- 25 | 29- 14- 43 |
| 578 | 1882- 8-13-21-10 | 15- 10- 50 | | 14- 04- 59 | 29- 15- 49 |
| 578 | 1944- 8-18-20-25 | 15- 09- 35 | | 14- 06- 37 | 29- 16- 12 |
| 579 | 1882- 9-12-12-59 | 14- 06- 01 | | 15- 11- 01 | 29- 17- 02 |
| 579 | 1944- 9-17-12-37 | 14- 04- 23 | | 15- 12- 35 | 29- 16- 58 |
| 580 | 1882-10-12-06-01 | 12- 22- 59 | | 16- 18- 20 | 29- 17- 19 |
| 580 | 1944-10-17-05-35 | 12- 20- 25 | | 16- 20- 29 | 29- 16- 54 |
| 581 | 1882-11-10-23-20 | 11- 07- 40 | | 18- 08- 38 | 29- 16- 18 |
| 581 | 1944-11-15-22-29 | 11- 05- 31 | | 18- 10- 34 | 29- 16- 05 |
| 582 | 1882-12-10-15-38 | 08- 03- 22 | | 21- 10- 59 | 29- 14- 21 |
| 582 | 1944-12-15-14-34 | 07- 21- 26 | | 21- 17- 06 | 29- 14- 32 |
| 583 | 1883- 1-09-05-59 | 03- 15- 01 | | 25- 21- 10 | 29- 12- 11 |
| 583 | 1945- 1-14-05-06 | 03- 11- 54 | | 26- 00- 33 | 29- 12- 27 |
| 584 | 1883- 2-07-18-10 | 01- 20- 50 | | 27- 13- 31 | 29- 10- 21 |
| 584 | 1945- 2-12-17-33 | 01- 18- 27 | | 27- 15- 51 | 29- 10- 18 |
| 585 * | 1883- 3-09-04-31 | 00- 18- 29 | 28-11 | 00- 03- 36 | 29- 09- 05 |
| 585 * | 1945- 3-14-03-51 | 00- 17- 09 | 28-11 | 00- 04- 29 | 29- 08- 38 |
| 586 | 1883- 4-07-13-36 | 28- 06- 24 | | 01- 01- 58 | 29- 08- 22 |
| 586 | 1945- 4-12-12-29 | 28- 05- 31 | | 01- 02- 21 | 29- 07- 52 |
| 587 | 1883- 5-06-21-58 | 27- 02- 02 | | 02- 06- 13 | 29- 08- 15 |
| 587 | 1945- 5-11-20-21 | 26- 23- 39 | | 02- 08- 26 | 29- 08- 05 |
| 588 | 1883- 6-05-06-13 | 25- 02- 47 | | 04- 06- 04 | 29- 08- 51 |
| 588 | 1945- 6-10-04-26 | 24- 21- 34 | | 04- 11- 35 | 29- 09- 09 |
| 589 | 1883- 7-04-15-04 | 20- 21- 56 | | 08- 12- 26 | 29- 10- 22 |
| 589 | 1945- 7-09-13-35 | 20- 16- 25 | | 08- 18- 32 | 29- 10- 57 |
| 590 | 1883- 8-03-01-26 | 18- 05- 34 | | 11- 07- 14 | 29- 12- 48 |
| 590 | 1945- 8-08-00-32 | 18- 03- 28 | | 11- 09- 43 | 29- 13- 11 |
| 591 | 1883- 9-01-14-14 | 16- 16- 46 | | 12- 22- 54 | 29- 15- 40 |
| 591 | 1945- 9-06-13-43 | 16- 14- 17 | | 13- 01- 22 | 29- 15- 39 |
| 592 | 1883-10-01-05-54 | 15- 11- 06 | | 14- 06- 57 | 29- 18- 03 |
| 592 | 1945-10-06-05-22 | 15- 08- 38 | | 14- 09- 11 | 29- 17- 49 |
| 593 | 1883-10-30-23-57 | 14- 07- 03 | | 15- 11- 54 | 29- 18- 57 |
| 593 | 1945-11-04-23-11 | 14- 02- 49 | | 15- 16- 06 | 29- 18- 55 |
| 594 | 1883-11-29-18-54 | 12- 21- 06 | | 16- 21- 00 | 29- 18- 06 |
| 594 | 1945-12-04-18-06 | 12- 18- 54 | | 16- 23- 30 | 29- 18- 24 |
| 595 | 1883-12-29-13-00 | 11- 04- 00 | | 18- 12- 01 | 29- 16- 01 |
| 595 | 1946- 1-03-12-30 | 10- 23- 30 | | 18- 16- 43 | 29- 16- 13 |
| 596 | 1884- 1-28-05-01 | 07- 15- 59 | | 21- 21- 35 | 29- 13- 34 |
| 596 | 1946- 2-02-04-43 | 07- 05- 17 | | 22- 08- 01 | 29- 13- 18 |
| 597 | 1884- 2-26-18-35 | 03- 11- 25 | | 25- 23- 48 | 29- 11- 13 |
| 597 | 1946- 3-03-18-01 | 03- 06- 59 | | 26- 03- 37 | 29- 10- 36 |
| 598 * | 1884- 3-27-05-48 | 01- 19- 12 | | 27- 13- 58 | 29- 09- 10 |
| 598 * | 1946- 4-02-04-37 | 01- 17- 23 | | 27- 15- 16 | 29- 08- 39 |
| 599 | 1884- 4-25-14-58 | 00- 18- 02 | 28-10 | 00- 03- 37 | 29- 07- 39 |
| 599 | 1946- 5-01-13-16 | 00- 16- 44 | 28-10 | 00- 04- 49 | 29- 07- 33 |
| 600 | 1884- 5-24-22-37 | 28- 05- 23 | | 01- 01- 33 | 29- 06- 56 |
| 600 | 1946- 5-30-20-49 | 28- 03- 11 | | 01- 04- 06 | 29- 07- 17 |
| 601 | 1884- 6-23-05-33 | 27- 01- 27 | | 02- 05- 54 | 29- 07- 21 |
| 601 | 1946- 6-29-04-06 | 26- 22- 54 | | 02- 08- 53 | 29- 07- 47 |
| 602 | 1884- 7-22-12-54 | 25- 04- 06 | | 04- 04- 54 | 29- 09- 00 |
| 602 | 1946- 7-28-11-53 | 24- 22- 07 | | 04- 11- 07 | 29- 09- 14 |
| 603 | 1884- 8-20-21-54 | 20- 20- 06 | | 08- 15- 37 | 29- 11- 43 |
| 603 | 1946- 8-26-21-07 | 20- 12- 53 | | 08- 22- 45 | 29- 11- 38 |
| 604 | 1884- 9-19-09-37 | 18- 04- 23 | | 11- 10- 31 | 29- 14- 54 |
| 604 | 1946- 9-25-08-45 | 18- 01- 15 | | 11- 13- 32 | 29- 14- 47 |
| 605 | 1884-10-19-00-31 | 16- 15- 29 | | 13- 02- 12 | 29- 17- 41 |
| 605 | 1946-10-24-23-32 | 16- 13- 28 | | 13- 04- 24 | 29- 17- 52 |
| 606 | 1884-11-17-18-12 | 15- 08- 48 | | 14- 10- 25 | 29- 19- 13 |
| 606 | 1946-11-23-17-24 | 15- 06- 36 | | 14- 13- 06 | 29- 19- 42 |
| 607 | 1884-12-17-13-25 | 14- 02- 35 | | 15- 16- 37 | 29- 19- 12 |
| 607 | 1946-12-23-13-06 | 14- 00- 54 | | 15- 18- 34 | 29- 19- 28 |
| 608 | 1885- 1-16-08-37 | 12- 17- 23 | | 17- 00- 22 | 29- 17- 45 |
| 608 | 1947- 1-22-08-34 | 12- 14- 26 | | 17- 03- 00 | 29- 17- 26 |
| 609 | 1885- 2-15-02-22 | 10- 21- 38 | | 18- 17- 37 | 29- 15- 15 |
| 609 | 1947- 2-21-02-00 | 10- 18- 00 | | 18- 20- 34 | 29- 14- 34 |
| 610 | 1885- 3-16-17-37 | 07- 03- 23 | | 22- 08- 52 | 29- 12- 15 |
| 610 | 1947- 3-22-16-34 | 06- 20- 26 | | 22- 15- 19 | 29- 11- 45 |
| 611 * | 1885- 4-15-05-52 | 03- 09- 08 | | 26- 00- 18 | 29- 09- 26 |
| 611 * | 1947- 4-21-04-19 | 03- 06- 41 | | 26- 02- 44 | 29- 09- 25 |
| 612 | 1885- 5-14-15-18 | 01- 18- 42 | | 27- 12- 42 | 29- 07- 24 |
| 612 | 1947- 5-20-13-44 | 01- 17- 16 | | 27- 14- 26 | 29- 07- 42 |
| 613 | 1885- 6-12-22-42 | 00- 17- 18 | 28-10 | 00- 03- 16 | 29- 06- 34 |
| 613 | 1947- 6-18-21-26 | 00- 16- 34 | 28-09 | 00- 05- 15 | 29- 06- 49 |
| 614 | 1885- 7-12-05-16 | 28- 04- 44 | | 01- 02- 14 | 29- 06- 58 |
| 614 | 1947- 7-18-04-15 | 28- 03- 45 | | 01- 03- 12 | 29- 06- 57 |
| 615 | 1885- 8-10-12-14 | 26- 19- 46 | | 02- 12- 43 | 29- 08- 29 |
| 615 | 1947- 8-16-11-12 | 26- 23- 48 | | 02- 08- 28 | 29- 08- 16 |
| 616 | 1885- 9-08-20-43 | 25- 02- 17 | | 04- 08- 31 | 29- 10- 48 |
| 616 | 1947- 9-14-19-28 | 24- 22- 32 | | 04- 12- 10 | 29- 10- 42 |
| 617 | 1885-10-08-07-31 | 20- 12- 29 | | 09- 01- 03 | 29- 13- 32 |
| 617 | 1947-10-14-06-10 | 20- 07- 50 | | 09- 06- 01 | 29- 13- 51 |
| 618 | 1885-11-06-21-03 | 17- 23- 57 | | 11- 16- 17 | 29- 16- 14 |
| 618 | 1947-11-12-20-01 | 17- 21- 59 | | 11- 18- 53 | 29- 16- 52 |
| 619 | 1885-12-06-13-17 | 16- 11- 43 | | 13- 06- 44 | 29- 18- 27 |
| 619 | 1947-12-12-12-53 | 16- 10- 07 | | 13- 08- 44 | 29- 18- 51 |
| 620 | 1886- 1-05-07-44 | 15- 05- 16 | | 14- 14- 15 | 29- 19- 31 |
| 620 | 1948- 1-11-07-44 | 15- 03- 16 | | 14- 16- 02 | 29- 19- 18 |
| 621 | 1886- 2-04-03-15 | 13- 22- 45 | | 15- 20- 04 | 29- 18- 49 |
| 621 | 1948- 2-10-03-02 | 13- 20- 58 | | 15- 21- 15 | 29- 18- 13 |
| 622 | 1886- 3-05-22-04 | 12- 03- 56 | | 17- 12- 31 | 29- 16- 27 |
| 622 | 1948- 3-10-21-15 | 12- 10- 45 | | 17- 05- 16 | 29- 16- 01 |
| 623 | 1886- 4-04-14-31 | 10- 15- 29 | | 18- 21- 43 | 29- 13- 12 |
| 623 | 1948- 4-09-13-16 | 10- 11- 44 | | 19- 01- 30 | 29- 13- 14 |
| 624 * | 1886- 5-04-03-43 | 06- 21- 17 | | 22- 12- 55 | 29- 10- 12 |
| 624 * | 1948- 5-09-02-30 | 06- 13- 30 | | 22- 20- 55 | 29- 10- 25 |
| 625 | 1886- 6-02-13-55 | 03- 09- 05 | | 25- 23- 07 | 29- 08- 12 |
| 625 | 1948- 6-07-12-55 | 03- 06- 05 | | 26- 02- 09 | 29- 08- 14 |
| 626 | 1886- 7-01-22-07 | 01- 18- 53 | | 27- 12- 26 | 29- 07- 19 |
| 626 | 1948- 7-06-21-09 | 01- 16- 51 | | 27- 14- 13 | 29- 07- 04 |
| 627 | 1886- 7-31-05-26 | 00- 17- 34 | | 28- 13- 54 | 29- 07- 28 |
| 627 | 1948- 8-05-04-13 | 00- 15- 47 | 28-10 | 00- 05- 21 | 29- 07- 08 |
| 628 | 1886- 8-29-12-54 | 00- 00- 06 | 28-06 | 01- 02- 19 | 29- 08- 25 |
| 628 | 1948- 9-03-11-21 | 28- 04- 39 | | 01- 03- 42 | 29- 08- 21 |
| 629 | 1886- 9-27-21-19 | 27- 02- 41 | | 02- 07- 15 | 29- 09- 56 |
| 629 | 1948-10-02-19-42 | 27- 00- 18 | | 02- 10- 02 | 29- 10- 20 |

TABLE 1 CONTINUED

* * * * * * * *

| COLUMN A NUMBER | COLUMN B YEAR-MO-DA-HR-MIN | COLUMN C DAS-HRS-MIN | COLUMN D DAS-HRS | COLUMN E DAS-HRS-MIN | COLUMN F DAS-HRS-MIN |
|---|---|---|---|---|---|
| 630 | 1886-10-27-07-15 | 24- 23- 45 | | 04- 12- 19 | 29- 12- 04 |
| 630 | 1948-11-01-06-02 | 24- 18- 58 | | 04- 17- 44 | 29- 12- 42 |
| 631 | 1886-11-25-19-19 | 20- 04- 41 | | 09- 09- 55 | 29- 14- 36 |
| 631 | 1948-11-30-18-44 | 19- 22- 16 | | 09- 16- 44 | 29- 15- 00 |
| 632 | 1886-12-25-09-55 | 17- 20- 05 | | 11- 21- 01 | 29- 17- 06 |
| 632 | 1948-12-30-09-44 | 17- 17- 16 | | 11- 23- 42 | 29- 16- 58 |
| 633 | 1887- 1-24-03-01 | 16- 08- 59 | | 13- 09- 40 | 29- 18- 39 |
| 633 | 1949- 1-29-02-42 | 16- 07- 18 | | 13- 10- 55 | 29- 18- 13 |
| 634 | 1887- 2-22-21-40 | 15- 02- 20 | | 14- 16- 10 | 29- 18- 30 |
| 634 | 1949- 2-27-20-55 | 15- 00- 05 | | 14- 18- 11 | 29- 18- 16 |
| 635 | 1887- 3-24-16-10 | 13- 19- 50 | | 15- 20- 53 | 29- 16- 43 |
| 635 | 1949- 3-29-15-11 | 13- 17- 49 | | 15- 23- 02 | 29- 16- 51 |
| 636 | 1887- 4-23-08-53 | 12- 09- 07 | | 17- 05- 06 | 29- 14- 13 |
| 636 | 1949- 4-28-08-02 | 12- 06- 58 | | 17- 07- 24 | 29- 14- 22 |
| 637 * | 1887- 5-22-23-06 | 10- 12- 54 | | 18- 22- 53 | 29- 11- 47 |
| 637 * | 1949- 5-27-22-24 | 10- 08- 36 | | 19- 03- 02 | 29- 11- 38 |
| 638 | 1887- 6-21-10-53 | 06- 20- 07 | | 22- 13- 50 | 29- 09- 57 |
| 638 | 1949- 6-26-10-02 | 06- 11- 58 | | 22- 21- 33 | 29- 09- 31 |
| 639 | 1887- 7-20-20-50 | 03- 09- 10 | | 25- 23- 39 | 29- 08- 49 |
| 639 | 1949- 7-25-19-33 | 03- 05- 27 | | 26- 02- 59 | 29- 08- 26 |
| 640 | 1887- 8-19-05-39 | 01- 18- 21 | | 27- 14- 00 | 29- 08- 21 |
| 640 | 1949- 8-24-03-59 | 01- 17- 01 | | 27- 15- 21 | 29- 08- 22 |
| 641 | 1887- 9-17-14-00 | 00- 17- 00 | 28-11 | 00- 04- 35 | 29- 08- 35 |
| 641 | 1949- 9-22-12-21 | 00- 15- 39 | 28-11 | 00- 06- 23 | 29- 09- 02 |
| 642 | 1887-10-16-22-35 | 28- 06- 25 | | 01- 03- 08 | 29- 09- 33 |
| 642 | 1949-10-21-21-23 | 28- 04- 37 | | 01- 05- 29 | 29- 10- 06 |
| 643 | 1887-11-15-08-08 | 27- 01- 52 | | 02- 09- 21 | 29- 11- 13 |
| 643 | 1949-11-20-07-29 | 26- 23- 31 | | 02- 11- 55 | 29- 11- 26 |
| 644 | 1887-12-14-19-21 | 24- 16- 39 | | 04- 20- 39 | 29- 13- 18 |
| 644 | 1949-12-19-18-55 | 24- 11- 05 | | 05- 01- 59 | 29- 13- 04 |
| 645 | 1888- 1-13-08-39 | 19- 20- 21 | | 09- 18- 52 | 29- 15- 13 |
| 645 | 1950- 1-18-07-59 | 19- 16- 01 | | 09- 22- 53 | 29- 14- 54 |
| 646 | 1888- 2-11-23-52 | 17- 16- 08 | | 12- 00- 21 | 29- 16- 29 |
| 646 | 1950- 2-16-22-53 | 17- 14- 07 | | 12- 02- 20 | 29- 16- 27 |
| 647 | 1888- 3-12-16-21 | 16- 06- 39 | | 13- 10- 08 | 29- 16- 47 |
| 647 | 1950- 3-18-15-20 | 16- 04- 40 | | 13- 12- 25 | 29- 17- 05 |
| 648 | 1888- 4-11-09-08 | 14- 23- 52 | | 14- 16- 24 | 29- 16- 16 |
| 648 | 1950- 4-17-08-25 | 14- 22- 35 | | 14- 17- 54 | 29- 16- 29 |
| 649 | 1888- 5-11-01-24 | 13- 17- 36 | | 15- 21- 34 | 29- 15- 10 |
| 649 | 1950- 5-17-00-54 | 13- 15- 06 | | 15- 23- 53 | 29- 14- 59 |
| 650 * | 1888- 6-09-16-34 | 12- 07- 26 | | 17- 06- 17 | (29- 13- 12) |
| 650 * | 1950- 6-15-15-53 | 12- 05- 07 | | 17- 08- 05 | (29- 13- 12) |
| 651 | 1888- 7-09-06-17 | 10- 10- 43 | | 19- 01- 21 | 29- 12- 04 |
| 651 | 1950- 7-15-05-05 | 10- 07- 55 | | 19- 03- 48 | 29- 11- 43 |
| 652 | 1888- 8-07-18-21 | 06- 17- 39 | | 22- 16- 56 | 29- 10- 35 |
| 652 | 1950- 8-13-16-48 | 06- 12- 12 | | 22- 22- 29 | 29- 10- 41 |
| 653 | 1888- 9-06-04-56 | 03- 06- 04 | | 26- 03- 34 | 29- 09- 38 |
| 653 | 1950- 9-12-03-29 | 03- 03- 31 | | 26- 06- 33 | 29- 10- 04 |
| 654 | 1888-10-05-14-34 | 01- 16- 26 | | 27- 17- 02 | 29- 09- 28 |
| 654 | 1950-10-11-13-33 | 01- 14- 27 | | 27- 19- 25 | 29- 09- 52 |
| 655 | 1888-11-04-00-02 | 00- 14- 58 | 28-13 | 00- 06- 06 | 29- 10- 04 |
| 655 | 1950-11-09-23-25 | 00- 13- 35 | 28-12 | 00- 08- 28 | 29- 10- 03 |
| 656 | 1888-12-03-10-06 | 28- 07- 54 | 1888-12-31-18 | 01- 03- 08 | 29- 11- 02 |
| 656 | 1950-12-09-09-28 | 28- 03- 32 | 1951-1-06-13 | 01- 07- 10 | 29- 10- 42 |
| 657 | 1889- 1-01-21-08 | 26- 21- 52 | | 02- 14- 10 | 29- 12- 02 |
| 657 | 1951- 1-07-20-10 | 26- 18- 50 | | 02- 16- 54 | 29- 11- 44 |
| 658 | 1889- 1-31-09-10 | 24- 04- 50 | | 05- 08- 01 | 29- 12- 51 |
| 658 | 1951- 2-06-07-54 | 23- 23- 06 | | 05- 13- 50 | 29- [illegible]- 50 |
| 659 | 1889- 3-01-22-01 | 19- 02- 59 | | 10- 10- 37 | 29- 13- 36 |
| 659 | 1951- 3-07-20-50 | 19- 12- 10 | | 10- 01- 52 | 29- 14- 02 |
| 660 | 1889- 3-31-11-37 | 17- 14- 23 | | 12- 00- 05 | 29- 14- 28 |
| 660 | 1951- 4-06-10-52 | 17- 12- 08 | | 12- 02- 35 | 29- 14- 43 |
| 661 | 1889- 4-30-02-05 | 16- 04- 55 | | 13- 10- 20 | 29- 15- 15 |
| 661 | 1951- 5-06-01-35 | 16- 02- 25 | | 13- 12- 40 | 29- 15- 05 |
| 662 | 1889- 5-29-17-20 | 14- 22- 40 | | 14- 16- 54 | 29- 15- 34 |
| 662 | 1951- 6-04-16-40 | 14- 21- 20 | | 14- 17- 48 | 29- 15- 08 |
| 663 * | 1889- 6-28-08-54 | 13- 17- 06 | | 15- 22- 01 | 29- 15- 07 |
| 663 * | 1951- 7-04-07-48 | 13- 15- 12 | | 15- 23- 39 | 29- 14- 51 |
| 664 | 1889- 7-28-00-01 | 12- 06- 59 | | 17- 07- 00 | 29- 13- 59 |
| 664 | 1951- 8-02-22-39 | 12- 05- 21 | | 17- 08- 49 | 29- 14- 10 |
| 665 | 1889- 8-26-14-00 | 10- 11- 00 | | 19- 01- 42 | 29- 12- 42 |
| 665 | 1951- 9-01-12-49 | 10- 07- 11 | | 19- 05- 57 | 29- 13- 08 |
| 666 | 1889- 9-25-02-42 | 06- 13- 18 | | 22- 22- 26 | 29- 11- 44 |
| 666 | 1951-10-01-01-57 | 06- 05- 03 | | 23- 06- 54 | 29- 11- 57 |
| 667 | 1889-10-24-14-26 | 03- 02- 34 | | 26- 08- 44 | 29- 11- 18 |
| 667 | 1951-10-30-13-54 | 02- 23- 06 | | 26- 12- 00 | 29- 11- 06 |
| 668 | 1889-11-23-01-44 | 01- 14- 16 | | 27- 20- 53 | 29- 11- 09 |
| 668 | 1951-11-29-01-00 | 01- 12- 00 | | 27- 22- 43 | 29- 10- 43 |
| 669 | 1889-12-22-12-53 | 00- 12- 07 | 28-14 | 00- 08- 49 | 29- 10- 56 |
| 669 | 1951-12-28-11-43 | 00- 11- 17 | 28-13 | 00- 10- 26 | 29- 10- 43 |
| 670 | 1890- 1-20-23-49 | 28- 02- 11 | | 01- 08- 28 | 29- 10- 39 |
| 670 | 1952- 1-26-22-26 | 27- 23- 34 | | 01- 11- 16 | 29- 10- 50 |
| 671 | 1890- 2-19-10-28 | 26- 16- 32 | | 02- 18- 01 | 29- 10- 33 |
| 671 | 1952- 2-25-09-16 | 26- 12- 44 | | 02- 22- 12 | 29- 10- 56 |
| 672 | 1890- 3-20-21-01 | 23- 19- 59 | | 05- 15- 06 | 29- 11- 05 |
| 672 | 1952- 3-25-20-12 | 23- 11- 48 | | 05- 23- 27 | 29- 11- 15 |
| 673 | 1890- 4-19-08-06 | 19- 13- 54 | | 09- 22- 19 | 29- 12- 13 |
| 673 | 1952- 4-24-07-27 | 19- 08- 33 | | 10- 03- 28 | 29- 12- 01 |
| 674 | 1890- 5-18-20-19 | 17- 13- 41 | | 11- 23- 58 | 29- 13- 39 |
| 674 | 1952- 5-23-19-28 | 17- 11- 32 | | 12- 01- 45 | 29- 13- 17 |
| 675 | 1890- 6-17-09-58 | 16- 04- 02 | | 13- 10- 50 | 29- 14- 52 |
| 675 | 1952- 6-22-08-45 | 16- 02- 15 | | 13- 12- 30 | 29- 14- 45 |
| 676 * | 1890- 7-17-00-50 | 14- 22- 10 | | 14- 17- 20 | 29- 15- 30 |
| 676 * | 1952- 7-21-23-30 | 14- 20- 30 | | 14- 19- 20 | 29- 15- 50 |
| 677 | 1890- 8-15-16-20 | 13- 17- 40 | | 15- 21- 53 | 29- 15- 33 |
| 677 | 1952- 8-20-15-20 | 13- 14- 40 | | 16- 01- 22 | 29- 16- 02 |
| 678 | 1890- 9-14-07-53 | 12- 08- 07 | | 17- 07- 05 | 29- 15- 12 |
| 678 | 1952- 9-19-07-22 | 12- 05- 38 | | 17- 09- 42 | 29- 15- 20 |
| 679 | 1890-10-13-23-05 | 10- 10- 55 | | 19- 03- 38 | 29- 14- 33 |
| 679 | 1952-10-18-22-42 | 10- 07- 18 | | 19- 06- 56 | 29- 14- 14 |
| 680 | 1890-11-12-13-38 | 06- 04- 22 | | 23- 09- 11 | 29- 13- 33 |
| 680 | 1952-11-17-12-56 | 05- 19- 04 | | 23- 18- 02 | 29- 13- 06 |
| 681 | 1890-12-12-03-11 | 02- 21- 49 | | 26- 14- 25 | 29- 12- 14 |
| 681 | 1952-12-17-02-02 | 02- 18- 58 | | 26- 17- 08 | 29- 12- 06 |
| 682 | 1891- 1-10-15-25 | 01- 10- 35 | | 28- 00- 12 | 29- 10- 47 |
| 682 | 1953- 1-15-14-08 | 01- 08- 52 | | 28- 02- 10 | 29- 11- 02 |
| 683 | 1891- 2-09-02-12 | 00- 09- 48 | 28-13 | 00- 10- 51 | 29- 09- 39 |
| 683 | 1953- 2-14-01-10 | 00- 08- 50 | 28-13 | 00- 12- 05 | 29- 09- 55 |
| 684 | 1891- 3-10-11-51 | 27- 22- 09 | | 01- 10- 57 | 29- 09- 06 |
| 684 | 1953- 3-15-11-05 | 27- 19- 55 | | 01- 13- 09 | 29- 09- 04 |
| 685 | 1891- 4-08-20-57 | 26- 12- 03 | | 02- 21- 16 | 29- 09- 19 |
| 685 | 1953- 4-13-20-09 | 26- 08- 51 | | 03- 00- 06 | 29- 08- 57 |
| 686 | 1891- 5-08-06-16 | 23- 14- 44 | | 05- 19- 26 | 29- 10- 10 |
| 686 | 1953- 5-13-05-06 | 23- 08- 54 | | 06- 00- 55 | 29- 09- 49 |
| 687 | 1891- 6-06-16-26 | 19- 12- 34 | | 09- 22- 59 | (29- 11- 33) |
| 687 | 1953- 6-11-14-55 | 19- 09- 05 | | 10- 02- 28 | (29- 11- 33) |
| 688 | 1891- 7-06-03-59 | 17- 13- 01 | | 12- 00- 12 | 29- 13- 13 |
| 688 | 1953- 7-11-02-28 | 17- 11- 32 | | 12- 02- 10 | 29- 13- 42 |
| 689 * | 1891- 8-04-17-12 | 16- 03- 48 | | 13- 11- 16 | 29- 15- 04 |
| 689 * | 1953- 8-09-16-10 | 16- 01- 50 | | 13- 13- 47 | 29- 15- 37 |
| 690 | 1891- 9-03-08-16 | 14- 21- 44 | | 14- 18- 58 | 29- 16- 42 |
| 690 | 1953- 9-08-07-47 | 14- 20- 13 | | 14- 20- 40 | 29- 16- 53 |
| 691 | 1891-10-03-00-58 | 13- 16- 02 | | 16- 01- 33 | 29- 17- 35 |
| 691 | 1953-10-08-00-40 | 13- 15- 20 | | 16- 01- 58 | 29- 17- 18 |
| 692 | 1891-11-01-18-33 | 12- 06- 27 | | 17- 10- 45 | 29- 17- 12 |
| 692 | 1953-11-06-17-58 | 12- 05- 02 | | 17- 11- 48 | 29- 16- 50 |
| 693 | 1891-12-01-11-45 | 10- 06- 15 | | 19- 09- 20 | 29- 15- 35 |
| 693 | 1953-12-06-10-48 | 10- 03- 12 | | 19- 12- 21 | 29- 15- 33 |
| 694 | 1891-12-31-03-20 | 05- 13- 40 | | 23- 23- 39 | 29- 13- 19 |
| 694 | 1954- 1-05-02-21 | 05- 07- 39 | | 24- 05- 55 | 29- 13- 34 |
| 695 | 1892- 1-29-16-39 | 02- 16- 21 | | 26- 18- 47 | 29- 11- 08 |
| 695 | 1954- 2-03-15-55 | 02- 14- 05 | | 26- 21- 11 | 29- 11- 16 |
| 696 | 1892- 2-28-03-47 | 01- 08- 13 | | 28- 01- 18 | 29- 09- 31 |
| 696 | 1954- 3-05-03-11 | 01- 06- 49 | | 28- 02- 25 | 29- 09- 14 |
| 697 | 1892- 3-28-13-18 | 00- 08- 42 | 28-11 | 00- 12- 47 | 29- 08- 29 |
| 697 | 1954- 4-03-12-25 | 00- 07- 35 | 28-11 | 00- 13- 22 | 29- 07- 57 |
| 698 | 1892- 4-26-21-47 | 27- 19- 13 | | 01- 12- 49 | 29- 08- 02 |
| 698 | 1954- 5-02-20-22 | 27- 16- 38 | | 01- 15- 03 | 29- 07- 41 |
| 699 | 1892- 5-26-05-49 | 26- 08- 11 | | 03- 00- 07 | 29- 08- 18 |
| 699 | 1954- 6-01-04-03 | 26- 05- 57 | | 03- 02- 26 | 29- 08- 23 |
| 700 | 1892- 6-24-14-07 | 23- 12- 53 | | 05- 20- 31 | 29- 09- 24 |
| 700 | 1954- 6-30-12-26 | 23- 06- 34 | | 06- 03- 20 | 29- 09- 54 |
| 701 | 1892- 7-23-23-31 | 19- 11- 29 | | 09- 23- 59 | 29- 11- 28 |
| 701 | 1954- 7-29-22-20 | 19- 07- 40 | | 10- 04- 21 | 29- 12- 01 |

TABLE 1 CONTINUED

* * * * * * * *

| COLUMN A NUMBER | COLUMN B YEAR-MO-DA-HR-MIN | COLUMN C DAS-HRS-MIN | COLUMN D DAS-HRS | COLUMN E DAS-HRS-MIN | COLUMN F DAS-HRS-MIN |
|---|---|---|---|---|---|
| 702 * | 1892- 8-22-10-59 | 17- 12- 01 | | 12- 02- 16 | 29- 14- 17 |
| 702 * | 1954- 8-28-10-21 | 17- 09- 39 | | 12- 04- 50 | 29- 14- 29 |
| 703 | 1892- 9-21-01-16 | 16- 03- 44 | | 13- 13- 24 | 29- 17- 08 |
| 703 | 1954- 9-27-00-50 | 16- 01- 10 | | 13- 15- 47 | 29- 16- 57 |
| 704 | 1892-10-20-18-24 | 14- 21- 36 | | 14- 21- 19 | 29- 18- 55 |
| 704 | 1954-10-26-17-47 | 14- 19- 13 | | 14- 23- 30 | 29- 18- 43 |
| 705 | 1892-11-19-13-19 | 13- 14- 41 | | 16- 04- 13 | 29- 18- 54 |
| 705 | 1954-11-25-12-30 | 13- 13- 30 | | 16- 05- 33 | 29- 19- 03 |
| 706 | 1892-12-19-08-13 | 12- 03- 47 | | 17- 13- 28 | 29- 17- 15 |
| 706 | 1954-12-25-07-33 | 12- 01- 27 | | 17- 16- 06 | 29- 17- 33 |
| 707 | 1893- 1-18-01-28 | 10- 00- 32 | | 19- 14- 17 | 29- 14- 49 |
| 707 | 1955- 1-24-01-06 | 09- 17- 54 | | 19- 20- 54 | 29- 14- 48 |
| 708 | 1893- 2-16-16-17 | 05- 04- 43 | | 24- 07- 34 | 29- 12- 17 |
| 708 | 1955- 2-22-15-54 | 04- 21- 06 | | 24- 14- 42 | 29- 11- 48 |
| 709 | 1893- 3-18-04-34 | 02- 14- 26 | | 26- 19- 35 | 29- 10- 01 |
| 709 | 1955- 3-24-03-42 | 02- 12- 18 | | 26- 21- 06 | 29- 09- 24 |
| 710 | 1893- 4-16-14-35 | 01- 07- 25 | | 28- 00- 47 | 29- 08- 12 |
| 710 | 1955- 4-22-13-06 | 01- 05- 54 | | 28- 01- 58 | 29- 07- 52 |
| 711 | 1893- 5-15-22-47 | 00- 08- 13 | 28-09 | 00- 13- 51 | 29- 07- 04 |
| 711 | 1955- 5-21-20-58 | 00- 07- 02 | 28-10 | 00- 14- 12 | 29- 07- 14 |
| 712 | 1893- 6-14-05-51 | 27- 18- 09 | | 01- 12- 47 | 29- 06- 56 |
| 712 | 1955- 6-20-04-12 | 27- 15- 48 | | 01- 15- 34 | 29- 07- 22 |
| 713 | 1893- 7-13-12-47 | 26- 09- 13 | | 02- 22- 48 | 29- 08- 01 |
| 713 | 1955- 7-19-11-34 | 26- 06- 26 | | 03- 01- 58 | 29- 08- 24 |
| 714 | 1893- 8-11-20-48 | 23- 13- 12 | | 05- 21- 05 | 29- 10- 17 |
| 714 | 1955- 8-17-19-58 | 23- 05- 02 | | 06- 05- 19 | 29- 10- 21 |
| 715 * | 1893- 9-10-07-05 | 19- 08- 55 | | 10- 04- 27 | 29- 13- 22 |
| 715 * | 1955- 9-16-06-19 | 19- 04- 41 | | 10- 08- 32 | 29- 13- 13 |
| 716 | 1893-10-09-20-27 | 17- 10- 33 | | 12- 05- 57 | 29- 16- 30 |
| 716 | 1955-10-15-19-32 | 17- 07- 28 | | 12- 09- 01 | 29- 16- 29 |
| 717 | 1893-11-08-12-57 | 16- 01- 03 | | 13- 17- 40 | 29- 18- 43 |
| 717 | 1955-11-14-12-01 | 15- 22- 59 | | 13- 20- 07 | 29- 19- 06 |
| 718 | 1893-12-08-07-40 | 14- 19- 20 | | 15- 00- 07 | 29- 19- 27 |
| 718 | 1955-12-14-07-07 | 14- 16- 53 | | 15- 03- 01 | 29- 19- 54 |
| 719 | 1894- 1-07-03-07 | 13- 11- 53 | | 16- 06- 45 | 29- 18- 38 |
| 719 | 1956- 1-13-03-01 | 13- 09- 59 | | 16- 08- 38 | 29- 18- 37 |
| 720 | 1894- 2-05-21-45 | 11- 23- 15 | | 17- 17- 19 | 29- 16- 34 |
| 720 | 1956- 2-11-21-38 | 11- 20- 22 | | 17- 19- 36 | 29- 15- 58 |
| 721 | 1894- 3-07-14-19 | 09- 14- 41 | | 19- 23- 00 | 29- 13- 41 |
| 721 | 1956- 3-12-13-36 | 09- 10- 24 | | 20- 02- 39 | 29- 13- 03 |
| 722 | 1894- 4-06-04-00 | 05- 00- 00 | | 24- 10- 42 | 29- 10- 42 |
| 722 | 1956- 4-11-02-39 | 04- 19- 21 | | 24- 15- 04 | 29- 10- 25 |
| 723 | 1894- 5-05-14-42 | 02- 13- 18 | | 26- 18- 56 | 29- 086 14 |
| 723 | 1956- 5-10-13-04 | 02- 11- 56 | | 26- 20- 29 | 29- 08- 25 |
| 724 | 1894- 6-03-22-56 | 01- 07- 04 | | 27- 23- 46 | 29- 06- 50 |
| 724 | 1956- 6-08-21-29 | 01- 05- 31 | | 28- 01- 37 | 29- 07- 08 |
| 725 | 1894- 7-03-05-46 | 00- 08- 14 | 28-09 | 00- 13- 24 | 29- 06- 38 |
| 725 | 1956- 7-08-04-37 | 00- 06- 23 | 28-10 | 00- 14- 25 | 29- 06- 48 |
| 726 | 1894- 8-01-12-24 | 27- 18- 36 | | 01- 13- 05 | 29- 07- 41 |
| 726 | 1956- 8-06-11-25 | 27- 16- 35 | | 01- 14- 37 | 29- 07- 12 |
| 727 | 1894- 8-30-20-05 | 26- 09- 55 | | 02- 23- 44 | 29- 09- 39 |
| 727 | 1956- 9-04-18-57 | 26- 07- 03 | | 03- 02- 24 | 29- 09- 27 |
| 728 * | 1894- 9-29-05-44 | 23- 08- 16 | | 06- 03- 57 | 29- 12- 13 |
| 728 * | 1956-10-04-04-24 | 23- 01- 36 | | 06- 10- 23 | 29- 11- 59 |
| 729 | 1894-10-28-17-57 | 19- 03- 03 | | 10- 11- 54 | 29- 14- 57 |
| 729 | 1956-11-02-16-23 | 19- 00- 37 | | 10- 15- 12 | 29- 15- 49 |
| 730 | 1894-11-27-08-54 | 17- 06- 06 | | 12- 11- 20 | 29- 17- 26 |
| 730 | 1956-12-02-08-12 | 17- 04- 48 | | 12- 13- 13 | 29- 18- 01 |
| 731 | 1894-12-27-02-20 | 15- 21- 40 | | 13- 21- 26 | 29- 19- 06 |
| 731 | 1957- 1-01-02-13 | 15- 19- 47 | | 13- 23- 24 | 29- 19- 11 |
| 732 | 1895- 1-25-21-26 | 14- 15- 34 | | 15- 03- 44 | 29- 19- 18 |
| 732 | 1957- 1-30-21-24 | 14- 13- 36 | | 15- 05- 12 | 29- 18- 48 |
| 733 | 1895- 2-24-16-44 | 13- 08- 16 | | 16- 09- 25 | 29- 17- 41 |
| 733 | 1957- 3-01-16-12 | 13- 05- 48 | | 16- 11- 19 | 29- 17- 07 |
| 734 | 1895- 3-26-10-25 | 11- 18- 35 | | 17- 20- 11 | 29- 14- 46 |
| 734 | 1957- 3-31-09-19 | 11- 15- 41 | | 17- 22- 54 | 29- 14- 35 |
| 735 | 1895- 4-25-01-11 | 09- 08- 49 | | 20- 02- 46 | 29- 11- 35 |
| 735 | 1957- 4-29-23-54 | 09- 03- 06 | | 20- 08- 39 | 29- 11- 45 |
| 736 | 1895- 5-24-12-46 | 04- 22- 14 | | 24- 10- 51 | 29- 09- 05 |
| 736 | 1957- 5-29-11-39 | 04- 16- 21 | | 24- 16- 53 | 29- 09- 14 |
| 737 | 1895- 6-22-21-51 | 02- 13- 09 | | 26- 18- 32 | 29- 07- 41 |
| 737 | 1957- 6-27-20-53 | 02- 11- 07 | | 26- 20- 28 | 29- 07- 35 |
| 738 | 1895- 7-22-05-32 | 01- 07- 28 | | 27- 23- 56 | 29- 07- 24 |
| 738 | 1957- 7-27-04-28 | 01- 05- 32 | | 28- 01- 32 | 29- 07- 04 |
| 739 | 1895- 8-20-12-56 | 00- 08- 04 | 28-10 | 00- 13- 55 | 29- 07- 59 |
| 739 | 1957- 8-25-11-32 | 00- 06- 28 | 28-11 | 00- 14- 18 | 29- 07- 46 |
| 740 | 1895- 9-18-20-55 | 27- 19- 05 | | 01- 14- 10 | 29- 09- 15 |
| 740 | 1957- 9-23-19-18 | 27- 17- 42 | | 01- 15- 43 | 29- 09- 25 |
| 741 * | 1895-10-18-06-10 | 26- 09- 50 | | 03- 01- 12 | 29- 11- 02 |
| 741 * | 1957-10-23-04-43 | 26- 06- 17 | | 03- 05- 19 | 29- 11- 36 |
| 742 | 1895-11-16-17-12 | 22- 22- 48 | | 06- 14- 30 | 29- 13- 18 |
| 742 | 1957-11-21-16-19 | 22- 12- 41 | | 07- 01- 12 | 29- 13- 53 |
| 743 | 1895-12-16-06-30 | 18- 21- 30 | | 10- 18- 19 | (29- 15- 49) |
| 743 | 1957-12-21-06-12 | 18- 17- 48 | | 10- 22- 01 | (29- 15- 49) |
| 744 | 1896- 1-14-22-19 | 17- 03- 41 | | 12- 14- 13 | 29- 17- 54 |
| 744 | 1958- 1-19-22-01 | 17- 00- 59 | | 12- 16- 38 | 29- 17- 37 |
| 745 | 1896- 2-13-16-13 | 15- 18- 47 | | 13- 23- 48 | 29- 18- 35 |
| 745 | 1958- 2-18-15-38 | 15- 17- 22 | | 14- 00- 50 | 29- 18- 12 |
| 746 | 1896- 3-14-10-48 | 14- 12- 12 | | 15- 05- 23 | 29- 17- 35 |
| 746 | 1958- 3-20-09-50 | 14- 11- 10 | | 15- 06- 23 | 29- 17- 33 |
| 747 | 1896- 4-13-04-23 | 13- 04- 37 | | 16- 10- 47 | 29- 15- 24 |
| 747 | 1958- 4-19-03-23 | 13- 02- 37 | | 16- 13- 00 | 29- 15- 37 |
| 748 | 1896- 5-12-19-47 | 11- 15- 13 | | 17- 21- 43 | 29- 12- 56 |
| 748 | 1958- 5-18-19-00 | 11- 12- 00 | | 18- 00- 59 | 29- 12- 59 |
| 749 | 1896- 6-11-08-43 | 09- 06- 17 | | 20- 04- 35 | 29- 10- 52 |
| 749 | 1958- 6-17-07-59 | 09- 01- 01 | | 20- 09- 33 | 29- 10- 34 |
| 750 | 1896- 7-10-19-35 | 04- 22- 25 | | 24- 11- 02 | 29- 09- 27 |
| 750 | 1958- 7-16-18-33 | 04- 16- 27 | | 24- 16- 33 | 29- 09- 00 |
| 751 | 1896- 8-09-05-02 | 02- 12- 58 | | 26- 19- 43 | 29- 08- 41 |
| 751 | 1958- 8-15-03-33 | 02- 11- 27 | | 26- 21- 02 | 29- 08- 29 |
| 752 | 1896- 9-07-13-43 | 01- 06- 17 | | 28- 02- 18 | 29- 08- 35 |
| 752 | 1958- 9-13-12-02 | 01- 04- 58 | | 28- 03- 52 | 29- 08- 50 |
| 753 | 1896-10-06-22-18 | 00- 06- 42 | 28-12 | 00- 14- 27 | 29- 09- 09 |
| 753 | 1958-10-12-20-52 | 00- 05- 08 | 28-12 | 00- 16- 34 | 29- 09- 42 |
| 754 * | 1896-11-05-07-27 | 27- 18- 33 | | 01- 15- 51 | 29- 10- 24 |
| 754 * | 1958-11-11-06-34 | 27- 17- 26 | | 01- 17- 23 | 29- 10- 49 |
| 755 | 1896-12-04-17-51 | 26- 06- 09 | | 03- 06- 03 | 29- 12- 12 |
| 755 | 1958-12-10-17-23 | 26- 02- 37 | | 03- 09- 34 | 29- 12- 11 |
| 756 | 1897- 1-03-06-03 | 22- 08- 57 | | 07- 05- 13 | 29- 14- 10 |
| 756 | 1959- 1-09-05-34 | 22- 00- 26 | | 07- 13- 22 | 29- 13- 48 |
| 757 | 1897- 2-01-20-13 | 18- 17- 47 | | 10- 21- 56 | 29- 15- 43 |
| 757 | 1959- 2-07-19-22 | 18- 14- 38 | | 11- 00- 51 | 29- 15- 29 |
| 758 | 1897- 3-03-11-56 | 17- 00- 04 | | 12- 16- 24 | 29- 16- 28 |
| 758 | 1959- 3-09-10-51 | 16- 22- 09 | | 12- 18- 29 | 29- 16- 38 |
| 759 | 1897- 4-02-04-24 | 15- 16- 36 | | 13- 23- 46 | 29- 16- 22 |
| 759 | 1959- 4-08-03-29 | 15- 14- 31 | | 14- 02- 11 | 29- 16- 42 |
| 760 | 1897- 5-01-20-46 | 14- 10- 14 | | 15- 05- 26 | 29- 15- 40 |
| 760 | 1959- 5-07-20-11 | 14- 08- 49 | | 15- 06- 53 | 29- 15- 42 |
| 761 | 1897- 5-31-12-26 | 13- 03- 34 | | 16- 10- 55 | 29- 14- 29 |
| 761 | 1959- 6-06-11-53 | 13- 01- 07 | | 16- 13- 00 | 29- 14- 07 |
| 762 | 1897- 6-30-02-55 | 11- 14- 05 | | 17- 22- 58 | 29- 13- 03 |
| 762 | 1959- 7-06-02-00 | 11- 12- 00 | | 18- 00- 34 | 29- 12- 34 |
| 763 | 1897- 7-29-15-58 | 09- 05- 02 | | 20- 06- 29 | 29- 11- 31 |
| 763 | 1959- 8-04-14-34 | 09- 01- 26 | | 20- 09- 55 | 29- 11- 21 |
| 764 | 1897- 8-28-03-29 | 04- 18- 31 | | 24- 15- 46 | 29- 10- 17 |
| 764 | 1959- 9-03-01-55 | 04- 15- 05 | | 24- 19- 31 | 29- 10- 36 |
| 765 | 1897- 9-26-13-46 | 02- 10- 14 | | 26- 23- 28 | 29- 09- 42 |
| 765 | 1959-10-02-12-31 | 02- 08- 29 | | 27- 01- 41 | 29- 10- 10 |
| 766 | 1897-10-25-23-28 | 01- 03- 32 | | 28- 06- 20 | 29- 09- 52 |
| 766 | 1959-10-31-22-41 | 01- 02- 19 | | 28- 07- 46 | 29- 10- 05 |
| | | | 1897-12-23-03 | | |
| 767 * | 1897-11-24-09-20 | 00- 04- 40 | 28-13 | 00- 16- 55 | 29- 10- 35 |
| 767 * | 1959-11-30-08-46 | 00- 03- 14 | 28-13 | 00- 18- 09 | 29- 10- 23 |
| | | | 1959-12-29-01 | | |

# TABLE 2

SHOWING THE TIME THAT ELAPSED DURING SUCCESSIVE ROTATIONS OF THE LINE OF APSIDES OF THE MOON'S ORBIT ABOUT THE EARTH'S RADIUS VECTOR*

COLUMN "G"....TIME ELAPSED SINCE NEW MOON - GIVEN IN DAS-HRS.

COLUMN "H"....DATES OF MOON IN PERIGEE - YEAR-MO-DA-HR AS SHOWN.

COLUMN "K"....DURATION OF SUCCESSIVE ROTATION CYCLES - GIVEN IN DAS-HRS.

| COLUMN "G" DAS-HRS | COLUMN "H" YEAR-MO-DA-HR | COLUMN "K" DAS-HRS | COLUMN "G" CONT'D. DAS-HRS | COLUMN "H" CONT'D. YEAR-MO-DA-HR | COLUMN "K" CONT'D. DAS-HRS | COLUMN "G" CONT'D. DAS-HRS | COLUMN "H" CONT'D. YEAR-MO-DA-HR | COLUMN "K" CONT'D. DAS-HRS | COLUMN "G" CONT'D. DAS-HRS | COLUMN "H" CONT'D. YEAR-MO-DA-HR | COLUMN "K" CONT'D. DAS-HRS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13-05 | 1834- 4-22-10 | | 10-22 | 1865-12-29-03 | | 04-19 | 1897- 9-01-22 | | 01-13 | 1929- 5-10-20 | |
| 13-04 | 1835- 6-09-18 | 413-08 | 10-16 | 1867- 2-15-10 | 413-07 | 04-13 | 1898-10-20-02 | 413-03 | 01-14 | 1930- 6-28-03 | 413-07 |
| 13-04 | 1835- 6-09-18 | | 10-16 | 1867- 2-15-10 | | 04-13 | 1898-10-20-02 | | 01-13 | 1930- 6-28-03 | |
| 13-04 | 1836- 7-27-01 | 413-07 | 10-09 | 1868- 4-03-16 | 413-06 | 04-06 | 1899-12-07-06 | 413-04 | 01-14 | 1931- 8-15-10 | 413-07 |
| 13-04 | 1836- 7-27-01 | | 10-09 | 1868- 4-03-16 | | 04-05 | 1899-12-07-06 | | 01-14 | 1931- 8-15-10 | |
| 13-07 | 1837- 9-13-11 | 413-10 | 10-06 | 1869- 5-21-22 | 413-06 | 03-21 | 1901- 1-24-12 | 413-06 | 01-12 | 1932-10-01-17 | 413-07 |
| 13-07 | 1837- 9-13-11 | | 10-06 | 1869- 5-21-22 | | 03-21 | 1901- 1-24-12 | | 01-12 | 1932-10-01-17 | |
| 13-06 | 1838-10-31-20 | 413-09 | 10-03 | 1870- 7-09-03 | 413-05 | 03-18 | 1902- 3-13-21 | 413-09 | 01-09 | 1933-11-19-01 | 413-08 |
| 13-06 | 1838-10-31-20 | | 10-03 | 1870- 7-09-03 | | 03-18 | 1902- 3-13-21 | | 01-09 | 1933-11-19-01 | |
| 13-04 | 1839-12-19-07 | 413-11 | 10-04 | 1871- 8-26-11 | 413-08 | 03-15 | 1903- 5-01-05 | 413-08 | 01-07 | 1935- 1-06-12 | 413-11 |
| 13-04 | 1839-12-19-07 | | 10-04 | 1871- 8-26-11 | | 03-15 | 1903- 5-01-05 | | 01-07 | 1935- 1-06-12 | |
| 12-21 | 1841- 2-04-14 | 413-07 | 10-03 | 1872-10-12-19 | 413-08 | 03-16 | 1904- 6-17-13 | 413-08 | 01-03 | 1936- 2-23-22 | 413-10 |
| 12-21 | 1841- 2-04-14 | | 10-03 | 1872-10-12-19 | | 03-16 | 1904- 6-17-13 | | 01-03 | 1936- 2-23-22 | |
| 12-17 | 1842- 3-24-23 | 413-09 | 09-23 | 1873-11-30-03 | 413-08 | 03-16 | 1905- 8-04-20 | 413-07 | 01-03 | 1937- 4-12-08 | 413-10 |
| 12-17 | 1842- 3-24-23 | | 09-23 | 1873-11-30-03 | | 03-16 | 1905- 8-04-20 | | 01-03 | 1937- 4-12-08 | |
| 12-14 | 1843- 5-12-06 | 413-07 | 09-18 | 1875- 1-17-11 | 413-08 | 03-11 | 1906- 9-22-00 | 413-04 | 01-03 | 1938- 5-30-17 | 413-09 |
| 12-14 | 1843- 5-12-06 | | 09-18 | 1875- 1-17-11 | | 03-11 | 1906- 9-22-00 | | 01-03 | 1938- 5-30-17 | |
| 12-14 | 1844- 6-28-14 | 413-08 | 09-08 | 1876- 3-05-14 | 413-03 | 03-07 | 1907-11-09-06 | 413-06 | 01-02 | 1939- 7-17-23 | 413-06 |
| 12-14 | 1844- 6-28-14 | | 09-08 | 1876- 3-05-14 | | 03-07 | 1907-11-09-06 | | 01-02 | 1939- 7-17-23 | |
| 12-15 | 1845- 8-15-22 | 413-08 | 09-00 | 1877- 4-22-18 | 413-04 | 03-01 | 1908-12-26-13 | 413-07 | 01-02 | 1940- 9-03-06 | 413-07 |
| 12-15 | 1845- 8-15-22 | | 09-00 | 1877- 4-22-18 | | 03-01 | 1908-12-26-13 | | 01-02 | 1940- 9-03-06 | |
| 12-15 | 1846-10-03-07 | 413-09 | 08-21 | 1878- 6-09-23 | 413-05 | 02-21 | 1910- 2-12-22 | 413-09 | 01-00 | 1941-10-21-14 | 413-08 |
| 12-15 | 1846-10-03-07 | | 08-21 | 1878- 6-09-23 | | 02-21 | 1910- 2-12-22 | | 01-00 | 1941-10-21-14 | |
| 12-14 | 1847-11-20-17 | 413-10 | 08-19 | 1879- 7-28-04 | 413-05 | 02-19 | 1911- 4-02-08 | 413-10 | 00-22 | 1942-12-09-00 | 413-10 |
| 12-14 | 1847-11-20-17 | | 08-19 | 1879- 7-28-04 | | 02-19 | 1911- 4-02-08 | | 00-22 | 1942-12-09-00 | |
| 12-11 | 1849- 1-07-03 | 413-10 | 08-18 | 1880- 9-13-11 | 413-07 | 02-19 | 1912- 5-19-17 | 413-09 | 00-20 | 1944- 1-26-11 | 413-11 |
| 12-11 | 1849- 1-07-03 | | 08-18 | 1880- 9-13-11 | | 02-19 | 1912- 5-19-17 | | 00-20 | 1944- 1-26-11 | |
| 12-05 | 1850- 2-24-11 | 413-08 | 08-15 | 1881-10-31-18 | 413-07 | 02-19 | 1913- 7-07-00 | 413-07 | 00-17 | 1945- 3-14-21 | 413-10 |
| 12-05 | 1850- 2-24-11 | | 08-15 | 1881-10-31-18 | | 02-19 | 1913- 7-07-00 | | 00-17 | 1945- 3-14-21 | |
| 11-23 | 1851- 4-13-18 | 413-07 | 08-03 | 1882-12-18-19 | 413-01 | 02-19 | 1914- 8-24-07 | 413-07 | 00-17 | 1946- 5-02-06 | 413-09 |
| 11-23 | 1851- 4-13-18 | | 08-03 | 1882-12-18-19 | | 02-19 | 1914- 8-24-07 | | 00-17 | 1946- 5-02-06 | |
| 11-22 | 1852- 5-31-01 | 413-07 | 07-16 | 1884- 2-04-21 | 413-02 | 02-14 | 1915-10-11-12 | 413-05 | 00-17 | 1947- 6-19-14 | 413-08 |
| 11-22 | 1852- 5-31-01 | | 07-16 | 1884- 2-04-21 | | 02-14 | 1915-10-11-12 | | 00-17 | 1947- 6-19-14 | |
| 11-21 | 1853- 7-18-08 | 413-07 | 07-03 | 1885- 3-23-21 | 413-00 | 02-11 | 1916-11-27-20 | 413-08 | 00-16 | 1948- 8-05-20 | 413-06 |
| 11-21 | 1853- 7-18-08 | | 07-03 | 1885- 3-23-21 | | 02-11 | 1916-11-27-20 | | 00-16 | 1948- 8-05-20 | |
| 11-22 | 1854- 9-04-16 | 413-08 | 06-21 | 1886- 5-11-01 | 413-06 | 02-06 | 1918- 1-15-05 | 413-09 | 00-16 | 1949- 9-23-04 | 413-08 |
| 11-22 | 1854- 9-04-16 | | 06-21 | 1886- 5-11-01 | | 02-06 | 1918- 1-15-05 | | 00-16 | 1949- 9-23-04 | |
| 11-23 | 1855-10-23-02 | 413-10 | 06-20 | 1887- 6-28-07 | 413-06 | 02-04 | 1919- 3-04-15 | 413-10 | 00-14 | 1950-11-10-13 | 413-09 |
| 11-23 | 1855-10-23-02 | | 06-20 | 1887- 6-28-07 | | 02-04 | 1919- 3-04-15 | | 00-14 | 1950-11-10-13 | |
| 11-20 | 1856-12-09-12 | 413-09 | 06-18 | 1888- 8-14-12 | 413-05 | 02-03 | 1920- 4-21-01 | 413-10 | 00-11 | 1951-12-28-23 | 413-10 |
| 11-20 | 1856-12-09-12 | | 06-18 | 1888- 8-14-12 | | 02-03 | 1920- 4-21-01 | | 00-11 | 1951-12-28-23 | |
| 11-15 | 1858- 1-26-21 | 413-09 | 06-13 | 1889-10-01-16 | 413-04 | 02-03 | 1921- 6-08-09 | 413-08 | 00-09 | 1953- 2-14-10 | 413-11 |
| 11-15 | 1858- 1-26-21 | | 06-13 | 1889-10-01-16 | | 02-03 | 1921- 6-08-09 | | 00-09 | 1953- 2-14-10 | |
| 11-10 | 1859- 3-16-05 | 413-08 | 06-04 | 1890-11-18-18 | 413-02 | 02-03 | 1922- 7-26-16 | 413-07 | 00-08 | 1954- 4-03-20 | 413-10 |
| 11-10 | 1859- 3-16-05 | | 06-04 | 1890-11-18-18 | | 02-03 | 1922- 7-26-16 | | 00-08 | 1954- 4-03-20 | |
| 11-05 | 1860- 5-02-11 | 413-06 | 05-14 | 1892- 1-05-17 | 412-23 | 02-01 | 1923- 9-12-22 | 413-06 | 00-07 | 1955- 5-22-04 | 413-08 |
| 11-05 | 1860- 5-02-11 | | 05-14 | 1892- 1-05-17 | | 02-01 | 1923- 9-12-22 | | 00-07 | 1955- 5-22-04 | |
| 11-02 | 1861- 6-19-16 | 413-05 | 05-05 | 1893- 2-21-21 | 413-04 | 01-22 | 1924-10-30-05 | 413-07 | 00-06 | 1956- 7-08-11 | 413-07 |
| 11-02 | 1861- 6-19-16 | | 05-05 | 1893- 2-21-21 | | 01-22 | 1924-10-30-05 | | 00-06 | 1956- 7-08-11 | |
| 11-03 | 1862- 8-07-00 | 413-08 | 05-00 | 1894- 4-11-04 | 413-07 | 01-19 | 1925-12-17-14 | 413-09 | 00-06 | 1957- 8-25-18 | 413-07 |
| 11-03 | 1862- 8-07-00 | | 05-00 | 1894- 4-11-04 | | 01-19 | 1925-12-17-14 | | 00-06 | 1957- 8-25-18 | |
| 11-03 | 1863- 9-24-08 | 413-08 | 04-22 | 1895- 5-29-11 | 413-07 | 01-16 | 1927- 2-04-01 | 413-11 | 00-03 | 1958-10-13-02 | 413-08 |
| 11-03 | 1863- 9-24-08 | | 04-22 | 1895- 5-29-11 | | 01-16 | 1927- 2-04-01 | | 00-05 | 1958-10-13-02 | |
| 11-03 | 1864-11-10-18 | 413-10 | 04-22 | 1896- 7-15-18 | 413-07 | 01-15 | 1928- 3-23-11 | 413-10 | 00-03 | 1959-11-30-12 | 413-10 |
| 11-03 | 1864-11-10-18 | | 04-22 | 1896- 7-15-18 | | 01-15 | 1928- 3-23-11 | | 00-03 | 1959-11-30-12 | |
| 10-22 | 1865-12-29-03 | 413-09 | 04-19 | 1897- 9-01-22 | 413-04 | 01-14 | 1929- 5-10-20 | 413-09 | 00-01 | 1961- 1-16-23 | 413-11 |

*THE LIMITS OF EACH ROTATION THROUGH ABOUT 360 DEGREES BEING FIXED BY TWO SUCCESSIVE TIMES WHEN THE MOON WAS IN PERIGEE AFTER ABOUT THE SAME ELAPSED TIME AFTER NEW MOON.

112 PERIODS @ 413.309 DAS = 46290-13

# TABLE 3

SHOWING TWO CONSECUTIVE CYCLES OF SEVEN ROTATIONS TO EACH CYCLE OF THE LINE OF APSIDES OF THE MOON'S ORBIT ABOUT THE EARTH AS A POINT IN A LINE THROUGH THE EQUINOXES.

* * * * *

COLUMN "L"..Dates of successive Times when the Moon came to Perigee at about the same Hour Circle nearly Nine Years apart.

COLUMN "M"..Position in Right Ascension of the Moon in Perigee at the Limits of each Rotation.

COLUMN "P"..Elapsed Time between successive Dates in COLUMN "L" - indicated in ANOMALISTIC MONTHS, and in DAYS-HRS.

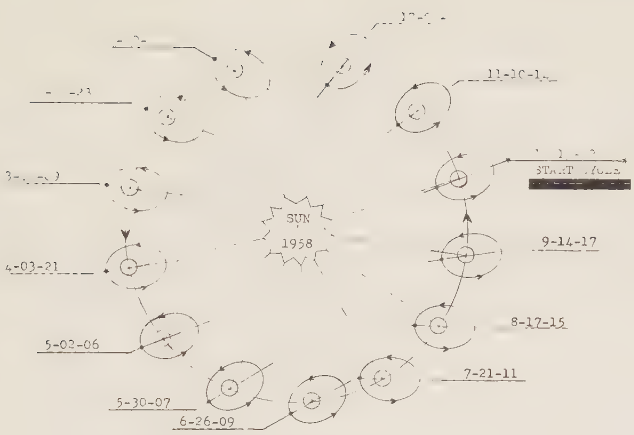
* * * * *

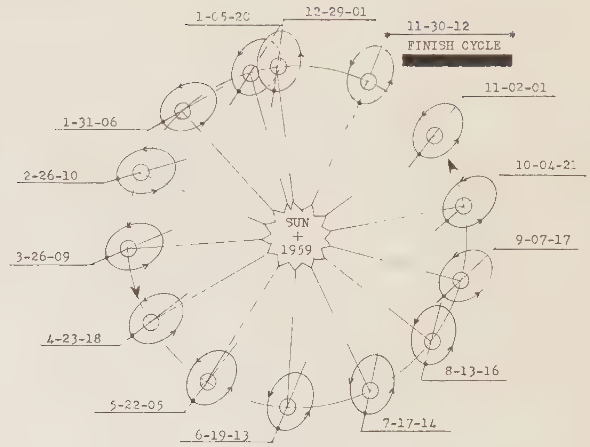
| COLUMN "L" YEAR-MO-DA-HR | COLUMN "M" RIGHT ASCENSION | COLUMN "P" ANOMALISTIC MONTHS | DAYS-HRS. |
|---|---|---|---|
| 1835-12-19-06 | 17hrs-05min-45sec..X | | |
| | | 114 | 3142-05 |
| 1844- 7-26-11 | 17hrs-21min-49sec | | |
| | | 119 | 3278-21 |
| 1853- 7-18-08 | 17hrs-37min-04sec | | |
| | | 119 | 3278-17 |
| 1862- 7-10-01 | 17hrs-43min-25sec | | |
| | | 113 | 3114-05 |
| 1871- 1-18-06 | 17hrs-19min-25sec | | |
| | | 119 | 3278-19 |
| 1880- 1-10-01 | 17hrs-29min-35sec | | |
| | | 119 | 3278-17 |
| 1888-12-31-18 | 17hrs-37min-38sec | | |
| | | 119 | 3278-09 |
| 1897-12-23-03 | 17hrs-22min-38sec..X | | |
| | | 114 | 3142-04 |
| 1906- 8-01-07 | 17hrs-37min-02sec | | |
| | | 119 | 3278-22 |
| 1915- 7-24-05 | 17hrs-54min-18sec | | |
| | | 119 | 3278-17 |
| 1924- 7-14-22 | 18hrs-00min-30sec | | |
| | | 113 | 3114-05 |
| 1933- 1-23-03 | 17hrs-34min-21sec | | |
| | | 119 | 3278-19 |
| 1942- 1-14-22 | 17hrs-46min-40sec | | |
| | | 119 | 3278-15 |
| 1951- 1-06-13 | 17hrs-47min-04sec | | |
| | | 119 | 3278-12 |
| 1959-12-29-01 | 17hrs-42min-17sec..X | | |
| | | 1644 | 45299-19 |

Average daily direct motion is 0.1114604 degrees.

Hector Wolfe 4/61

# DRAWING 2



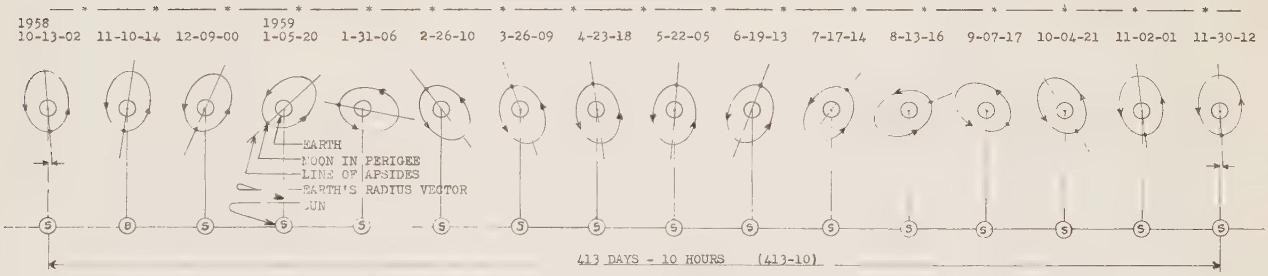

D E T A I L A.

TO ILLUSTRATE THE RELATIVE POSITIONS OF THE SUN, EARTH AND MOON AT TIMES WHEN THE MOON WAS IN PERIGEE IN 1958.

D E T A I L B.

TO ILLUSTRATE THE RELATIVE POSITIONS OF THE SUN, EARTH AND MOON AT TIMES WHEN THE MOON WAS IN PERIGEE IN 1959.

THE ABOVE DETAILS COMBINE TO ILLUSTRATE THE RELATIVE POSITIONS OF THE SUN, EARTH AND MOON AT TIMES WHEN THE MOON WAS IN PERIGEE DURING ONE COMPLETE ROTATION OF THE LINE OF APSIDES OF THE MOON'S ORBIT ABOUT THE EARTH AS A FUNCTIONARY OF THE EARTH'S RADIUS VECTOR, BETWEEN 1958-10-13-02 AND 1959-11-30-12.

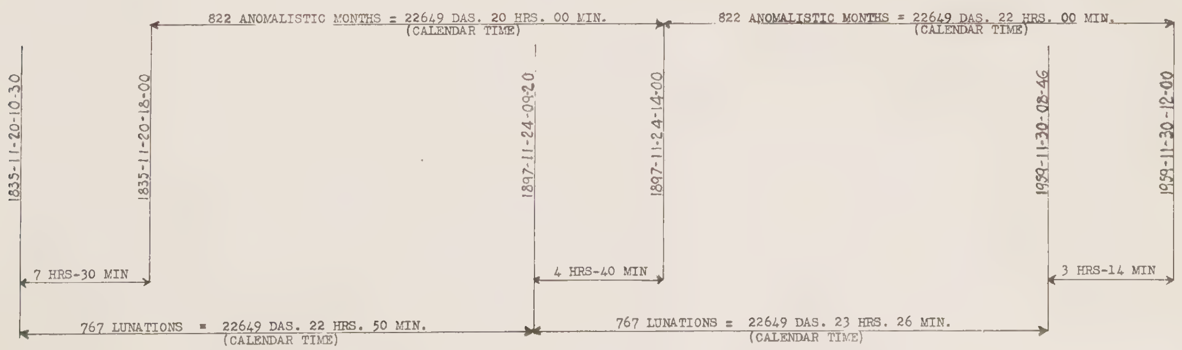



D E T A I L C.

SHOWING THE RELATIVE POSITIONS OF THE SUN, EARTH AND MOON ISOLATED FROM DETAILS A AND B ABOVE TO ACCENTUATE THE CHANGES IN ANGULAR RELATIONSHIP BETWEEN THE LINE OF APSIDES OF THE MOON'S ORBIT AND THE EARTH'S RADIUS VECTOR, FROM TIME TO TIME WHEN THE MOON CAME TO PERIGEE THROUGHOUT THE CYCLE FROM $\left\{\begin{array}{lcl}\text{YEAR-MO-DA-HR} & & \text{YEAR-MO-DA-HR}\\ \text{1958-10-13-02} & \text{TO} & \text{1959-11-30-12.}\end{array}\right\}$

THE NOMENCLATURE AT THE ASPECT FOR 1959-1-05-20 IS TYPICAL FOR ALL ASPECTS.

THE ROTATION OF THE LINE OF APSIDES OF THE MOON'S ORBIT ABOUT THE EARTH AS A FUNCTIONARY OF THE EARTH'S RADIUS VECTOR SHOWS TO BE CLOCKWISE IN DIRECTION.




D E T A I L D.

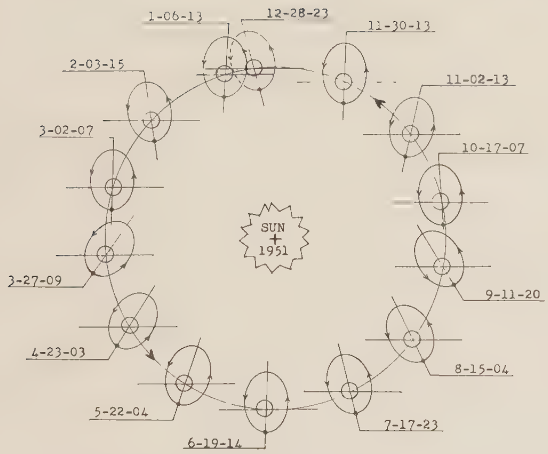
LINE DIAGRAM TO ILLUSTRATE THE RELATIONSHIP BETWEEN TWO CONSECUTIVE CYCLES EACH, OF 767 LUNATIONS AND 822 ANOMALISTIC MONTHS/

822 ANOMALISTIC MONTHS = 22649.84 DAYS OF ASTRONOMIC TIME.

767 LUNATIONS = 22649.96 DAYS OF ASTRONOMIC TIME.

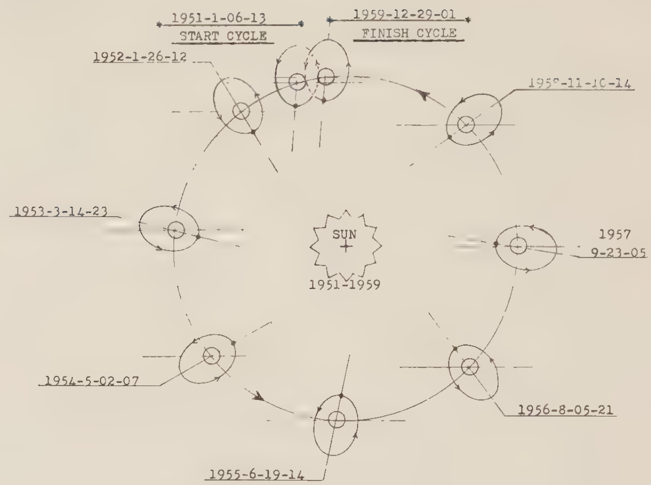
Hector Wolfe 4/61

# DRAWING 3



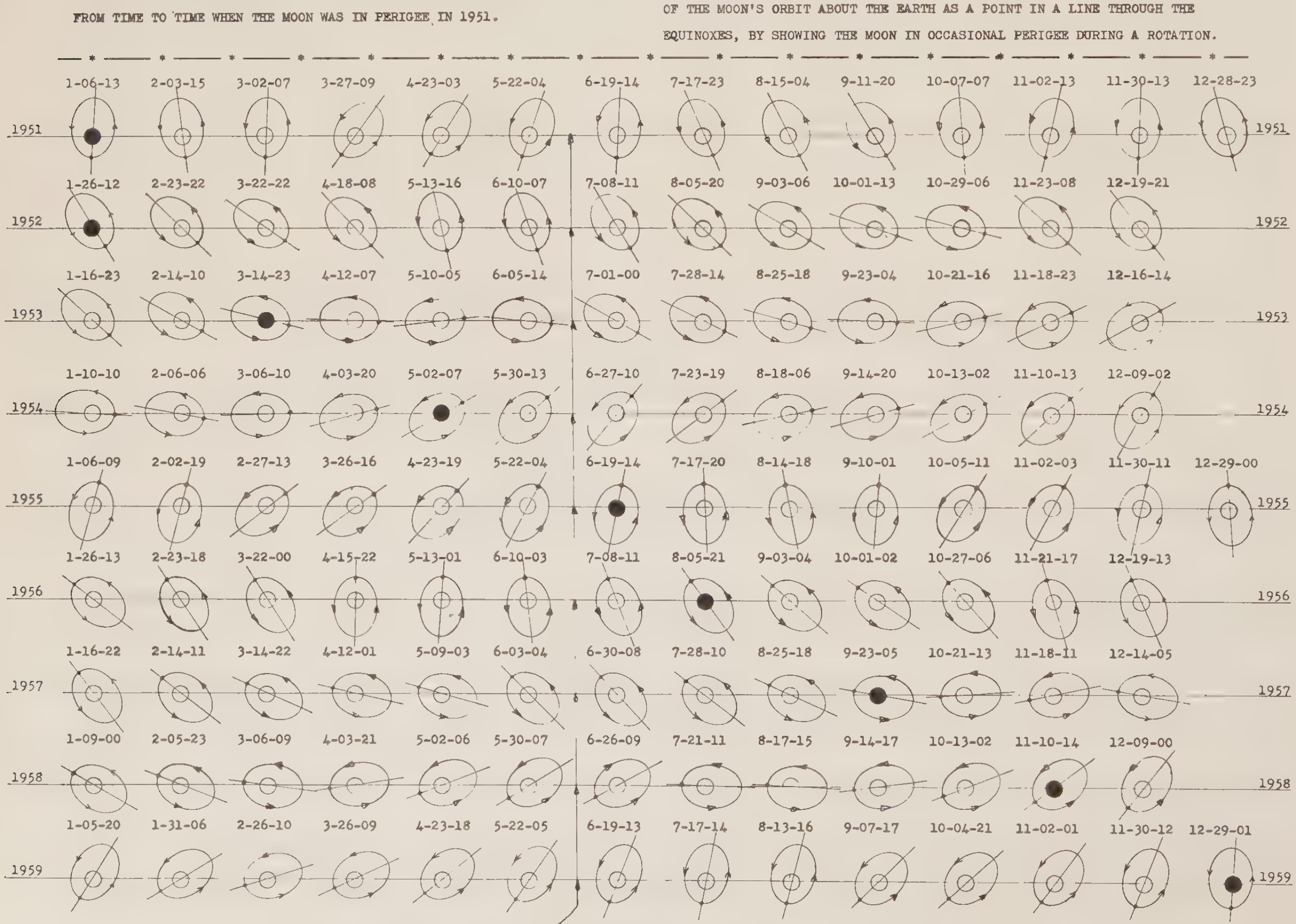

DETAIL E.

TO SHOW THE CHANGES IN THE ANGULAR RELATIONSHIP BETWEEN THE LINE OF APSIDES OF THE MOON'S ORBIT AND A LINE THROUGH THE EQUINOXES, FROM TIME TO TIME WHEN THE MOON WAS IN PERIGEE IN 1951.




DETAIL F.

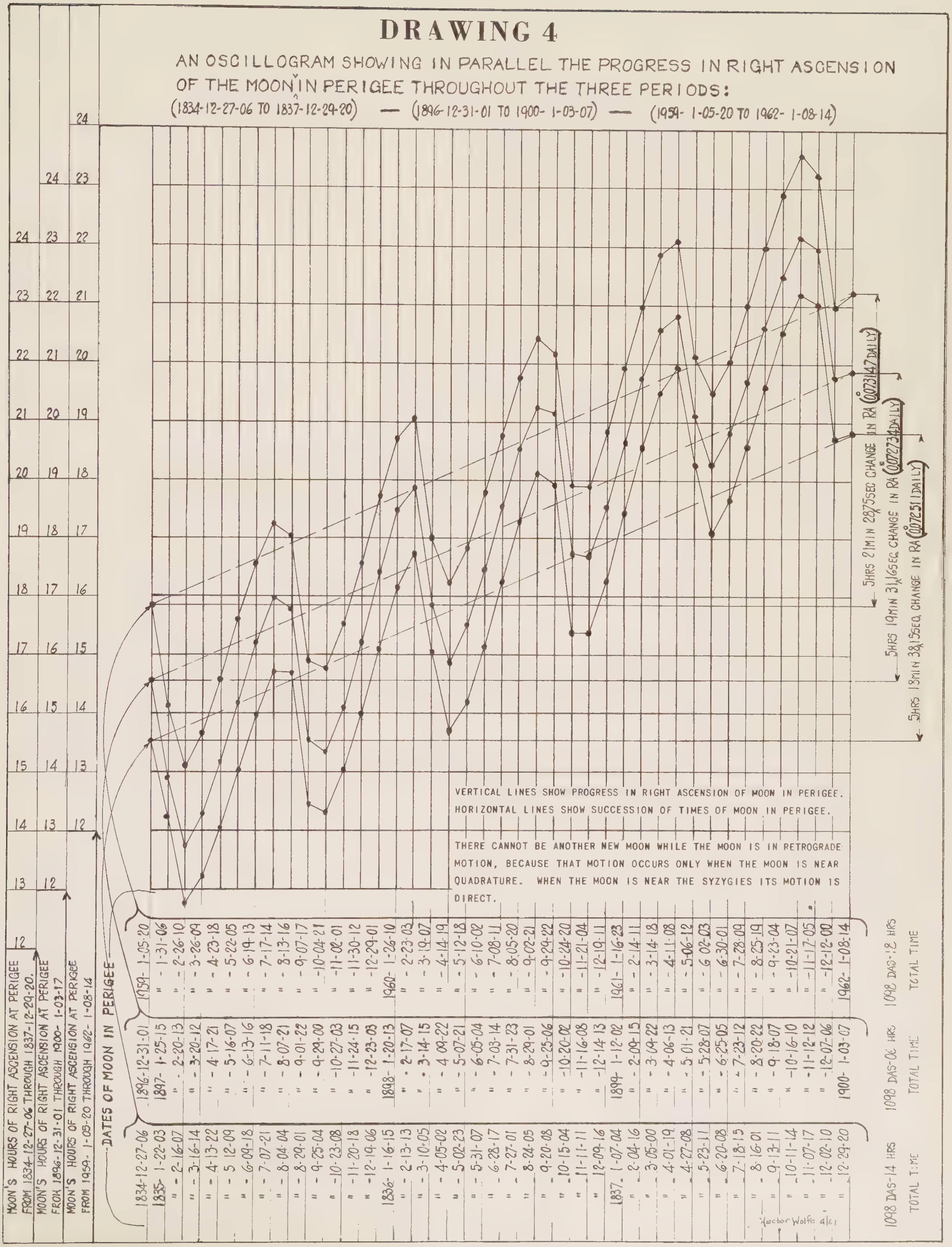
TO SHOW ROTATION IN A COUNTER-CLOCKWISE DIRECTION OF THE LINE OF APSIDES OF THE MOON'S ORBIT ABOUT THE EARTH AS A POINT IN A LINE THROUGH THE EQUINOXES, BY SHOWING THE MOON IN OCCASIONAL PERIGEE DURING A ROTATION.




DETAIL G.

SHOWING THE ANGULAR RELATIONSHIP BETWEEN THE LINE OF APSIDES OF THE MOON'S ORBIT AND A LINE THROUGH THE EQUINOXES AT ALL TIMES WHEN THE MOON WAS IN PERIGEE DURING THE PERIOD COMPREHENDED IN DETAIL "F" ABOVE. AN OSCILLATORY ROTARY MOTION OF THE LINE OF APSIDES IS DISCERNIBLE, AS WELL AS A RESIDUAL COUNTER-CLOCKWISE MOTION THAT BRINGS THE LINES OF APSIDES AT THE ENDS OF THE PERIOD EXHIBITED ABOVE INTO APPROXIMATE PARALLELISM.

Hector Wolfe 4/61


DRAWING 4
AN OSCILLOGRAM SHOWING IN PARALLEL THE PROGRESS IN RIGHT ASCENSION OF THE MOON IN PERIGEE THROUGHOUT THE THREE PERIODS:
(1834-12-27-06 TO 1837-12-29-20) — (1896-12-31-01 TO 1900-1-03-07) — (1959-1-05-20 TO 1962-1-08-14)
VERTICAL LINES SHOW PROGRESS IN RIGHT ASCENSION OF MOON IN PERIGEE.
HORIZONTAL LINES SHOW SUCCESSION OF TIMES OF MOON IN PERIGEE.
THERE CANNOT BE ANOTHER NEW MOON WHILE THE MOON IS IN RETROGRADE MOTION, BECAUSE THAT MOTION OCCURS ONLY WHEN THE MOON IS NEAR QUADRATURE. WHEN THE MOON IS NEAR THE SYZYGIES ITS MOTION IS DIRECT.
5HRS 21MIN 28.75SEC CHANGE IN RA (0.0731147 DAILY)
5HRS 19MIN 31.165SEC CHANGE IN RA (0.0727314 DAILY)
5HRS 18MIN 38.155SEC CHANGE IN RA (0.0725111 DAILY)
MOON'S HOURS OF RIGHT ASCENSION AT PERIGEE FROM 1834-12-27-06 THROUGH 1837-12-29-20.
MOON'S HOURS OF RIGHT ASCENSION AT PERIGEE FROM 1896-12-31-01 THROUGH 1900-1-03-17
MOON'S HOURS OF RIGHT ASCENSION AT PERIGEE FROM 1959-1-05-20 THROUGH 1962-1-08-14
DATES OF MOON IN PERIGEE
1098 DAS-14 HRS TOTAL TIME
1098 DAS-06 HRS TOTAL TIME
1098 DAS-18 HRS TOTAL TIME
Hector Wolfe 4/61

# THE 3.864-YEAR LEMMING CYCLE

# AND LATITUDINAL PASSAGE IN TEMPERATURE

By Leonard W. Wing

**ABSTRACT**

The wave length of the dominant cycle in Lemming abundance is recalibrated and established at 3.864 years. Tests of solar (sunspot) and geophysical (temperature) data show that this cycle influences all. It occurs also in the tree ring record used. The behavior with respect to the 3.864-year wave length demonstrates latitudinal passage. The conclusion is inescapable that a cycle pulse of 3.864 years, unknown though its identity may be, passes over the solar and terrestrial spheres, simultaneously equatorward from the two polar regions. While this pulse is powerful in the Lemmings, it is rather minor in temperature. The influence upon Lemming numbers would seem to be in some way other than through meteorological elements.

In 1957 I reported the length of the dominant cycle in Norwegian Lemmings as 3.862 years, the best that could be done by the time chart technique (Wing, 1957). Later I reported latitudinal passage in Lemmings and other rodents of North America, attuned beyond random behavior to the wave length and timing of the Norwegian Lemmings (Wing, 1960). The rodent reports are particularly hard to evaluate, being little more than casual mention of scarcity and abundance. Almost none has any quantitative character. Hence, it is not surprising that the relationship with Lemming timing and passage is rough indeed.

The wave length of 3.862 years is but a first approximation, though the best that was possible with the information available in Lemming records. The next step in defining the wave length more closely, and the task to which I turn in this paper, is testing the wave length in long records, the closeness of measurement being related to the length of record. Tree rings offer the best available long quantitative records of the past. Yet it must be recognized that one can hardly be sure always that the wave length which he isolates in tree rings is the same as the one whose approximation he has made in some other phenomenon, such as the Lemming outbreaks. There is also the matter of ring accuracy—some years may have double rings, some years may show none. The matter of ring counts has been dealt with by ring experts, who recognize the problem.

At the Tree Ring Laboratory of the University of Arizona, Tuscon, Arizona, I obtained a number of reliable records through the cooperation of Dr. Terah L. Smiley and others of the Laboratory. Their courtesy is most gratefully acknowledged. I have chosen the published record of a Limber Pine (*Pinus flexilis*) in the Snake River drainage near Ketchum, Idaho, measured by the late Dr. Edmund Schulman (Schulman, 1956). The record begins with 727 and continues complete to 1951, a span of 1225 years. So far as I can determine, the site is at 43.6° North, 114.4° West. The geomagnetic latitude of the site appears to be 50° North.

If there is a cycle pulse with latitudinal passage, it should appear in this tree ring record at 43.6° North, assuming that tree

rings respond to such a pulse, sometime after its appearance in the Lemming outbreaks at 64.5° North. For a cycle in the 3.86-year range, the appearance of such a cycle pulse in the Snake River tree rings ideally would be about 7 1/2 months later. This is a matter that we can test, once the wave length is established.

In order to minimize the effects of any long cycles that may be present in the 1225-year record of the tree rings, as well as growth changes with age, I made a 5-year moving average trend of the logarithms of the tree ring widths. I then obtained the deviations of the logarithms from this moving average trend and established them with log 2.000 as the trend. This eliminates negatives. A deviation of 0.010 below the moving average, for example, becomes log 1.990; while one 0.010 above the moving average becomes log 2.010. This does not change the relative values, adding a logarithm of 2.000 to all being the same as multiplying by a constant of 100.

I then set up a 3.862 periodic table of the deviations, and it indicated the wave length as longer by some 0.002.years. Accordingly, I went to 3.864 years. Not knowing what other wave lengths, if any, might need compensating for, I used the 42 lines of the tabulation sheets for dividing the 316 sections of the 1225 years into eight parts of 42 sections each. (Figures 1-8). Parts 1-7 use 294 sections, which leaves but 22 for part 8. Therefore I overlapped 20 sections onto part 7 to make the full 42 sections. Thus, part 8 (1787-1945 bases) has nearly half in common with part 7 (1702-1860 bases) and therefore should be less relied upon. Were there any known interfering cycles or known cycle remnants, the periodic table could be divided to minimize them.

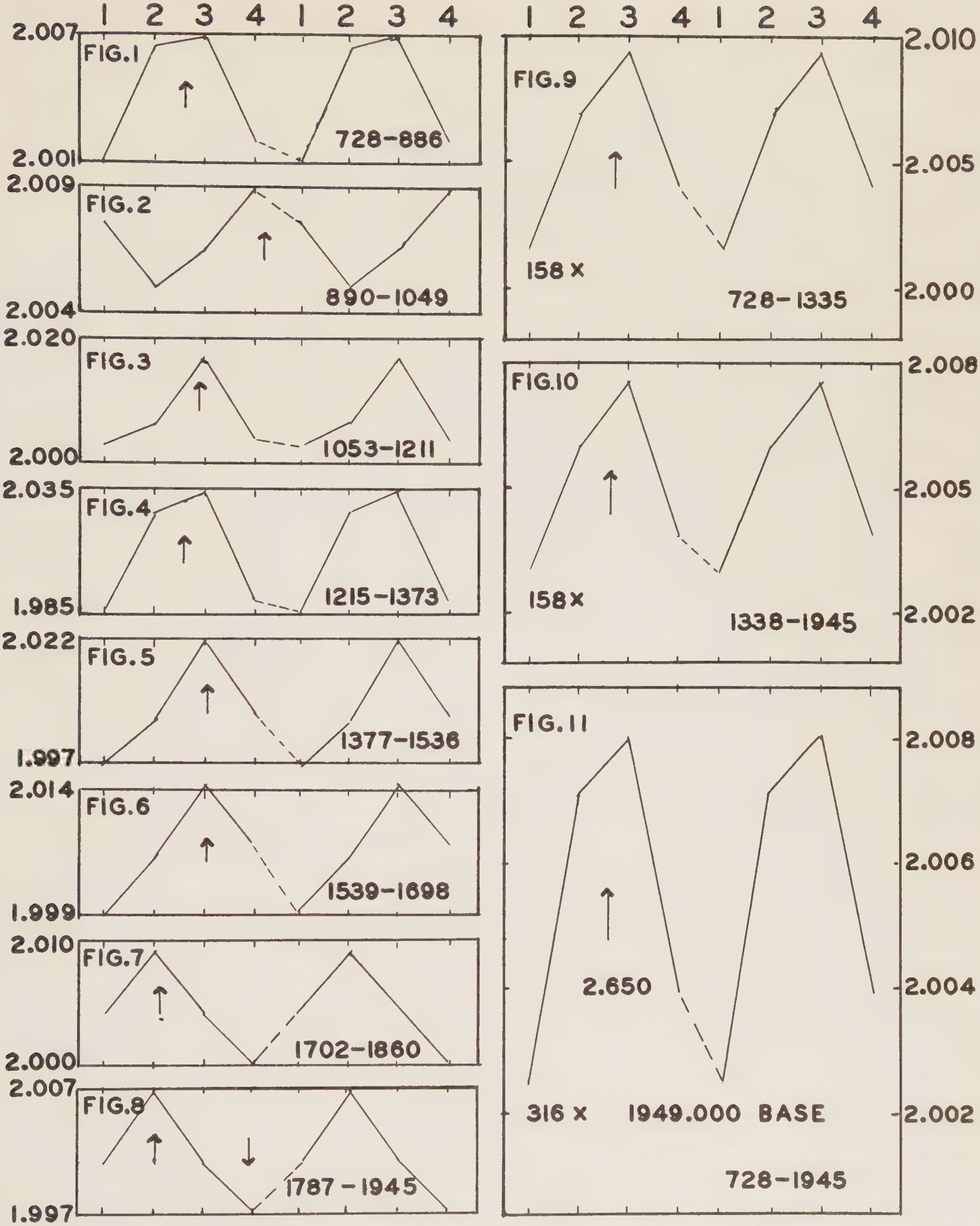
The timing of high in the 890-1049 part (Figure 2) has been pulled about one and three-quarters positions to the right. The remaining seven fall within half a year of the 2.650 position of the whole table (Figure 11). The position of strength for the several parts, respectively, vary around the timing of 2.650 during the history of the tree. Without the cycle pulse that is present, any strength would have been scattered at random, which is not the case.

If the position of strength (high) in the first half is compared with that in the second half, we have a measure of the slippage of the cycle involved. The highs in Figures 1-8 falling so close throughout tells us that the slippage is little, that we are extremely close to the correct measure of the wave length. The position of strength in the first 158 sections (728-1335 bases) and that of the second 158 sections (1338-1945 bases) are shown in Figures 9 and 10, respectively. Movement is slightly to the left in the two figures, which indicates a wave slightly shorter than 3.864 years. We can determine the amount. The slippage measures but 0.05 years in the 158 sections between the respective midpoints of the two parts, the midpoint being the average position for the respective parts. The wave length is therefore shorter than 3.864 years by 0.05 years in 158 sections or 0.0003 years for each section. Hence, the wave length may be considered as 3.864 +0.001 years.

The whole periodic table of 316 sections has the timing of high falling at 2.650 years after base, that of the low at 4.582 years after base (Figure 11). With a base of 1949.000 plus 0.500 years to post at midyear, this will give a calendar rendition of high as 1952.150 and forwards and backwards at 3.864-year intervals. The timing of low will be 1954.082 and forwards and backwards at 3.864-year intervals. The "tree ring year" is assumed as equivalent of the calendar year in the Northern Hemisphere, it representing the growing season. Midyear of the growing season could differ from midyear of the calendar. But this is something of which we know little.

The Lemming timing of high at 1929.6 (Wing, 1957) brought down to date in multiples of this new measure of the wave length gives the timing of epoch (high) as 1952.784, which posted at midyear gives calendar timing of 1953.284. This timing is 0.798 years before the timing (low) of the tree rings. The theoretical latitudinal passage of any cycle pulse between these latitudes would be 0.634 years for the 20.9°. It differs but 60 days from the actual as shown, which is close indeed.

The ideal timing of epoch (high) in the Norwegian Lemmings as best it can be shown by presently available information would seem to be 1953.284 and forwards and backwards at 3.864-year intervals. In nature, things seldom are ideal or typical, so many variables tug at any phenomenon. The actual expression of high in Lemmings will therefore be the ideal timing of the 3.864-year cycle pulse as pulled one way or the other by a host of events, biological and geophysical. In any one habitat or any one region, events random so far as the 3.864-year cycle is concerned can undoubtedly cause many variations. A high can be reduced (perhaps to zero and thereby be skipped) or delayed and perhaps be unrecognizable. A sudden decline for any of many reasons followed by a subsequent resurgence can give a double high. One high or low can merge into another so as not to be recognized. Differences of observation can give an appearance not real in itself.




3.864-YEAR PERIODIC TABLE OF A SNAKE RIVER LIMBER PINE TREE RING RECORD

FIG. 1—8: The Table Divided into Eight Sections
FIG. 9—10: First and Second Halves of the Table (158 Sections Each)
FIG. 11: The Entire Table

Figure 12 charts a 2-item moving average of the tree ring deviations from the five-year moving average since 1800. I have added a rigid 3.864-year wave length with timing of epoch (low) at 1954.082. A general agreement is clear. Only five of the expected thirty-nine highs fail to appear in the tree rings. These failures occur mostly in the 1880-1900 and 1915-1925 years, where some distorting influence seems to have overwhelmed the 3.864-year pulse. But the tree rings "snap back" to the previous timing after each distortion. This habit of "snapping back" to the previous condition after a distortion or gap in the record is a cycle characteristic. It indicates some external control to which they return as before. They do not seem ever to "slip a cog" as might be expected where they not under some compulsive, external control.

There exist environmental data of a quantitative nature usable in study of latitudinal passage with respect to the Lemming wave length. In this paper, I shall use yearly temperature. Presumably, other geophysical data would be equally usable. Because the Lemming wave length proves to have a low amplitude in temperature, where it is no more than a run-of-the-mill wave length at best, I set a limit of a century or longer record at any one station.

I took from *World Weather Records* (4 Vols. Smithsonian Institution and U.S. Weather Bureau) all temperature records 100 years or longer. The most equatorward turned out to be San Diego (32.7° North). In order to cover more latitude, I set up a secondary criterion of 84-99 years for other latitudes, 84 years giving 21 sections of 3.864 years after the necessary shortening by moving averages. Because there still was no station in the 20°-30° zone of latitude, I arbitrarily included Havana (23.1° North) with its 80 years (1871-1950). The stations with these shorter records are indicated on the epoch charts by X, those with a century or longer by 0 (Figures 52-53).

The temperature records included 24 a century or longer, eleven 84 to 99 years, and Havana of 80 years, which gives a total of 36. In addition, two longer records of lake ice break up, Lake Siljan (60.8° North, 1849-1955) and Lake Champlain (44.5° North, 1815-1954) are included, ice break up reflecting winter and spring temperatures. The epochs therefore number 38; to these must be added those of the Lemmings and tree rings for a final total of 40 terrestrial epochs.

I determined timings of strength (high) for the 38 stations by 3.864-year tables of the deviations from their 5-year moving average, programmed for base 1950.000. Hence, the base plus one-half years when added to the high renders the timing by the calendar. The position of strength (and of weakness) is shown by arrows in Figures 13-50. The calendar


FIG. 12: Snake River Tree Rings. A Smoothed Record of Deviations from a 5-Year Moving Average of the Data Compared to a Rigid 3.864-Year Wave with Timing of Epoch (Low) at 1954.082.

timings computed from these are given in Table 1.

In a like manner, I determined the timings of strength and weakness in the sunspot time series. The data are the relative numbers plus the sunspot number constant (Dewey, 1961). Because remnants of the overwhelmingly dominant 11.08-year sunspot cycles necessarily remained in the deviations from a 5-year moving average I used 43 sections of the 3.864-year periodic table, which passes the 11.08-year cycle across fifteen times. This thereby neutralizes any remnants. The most recent 43 sections were used, that is, the years 1792-1957, for observations prior to this are of rather low quality. Strength appears at 2.088 and weakness at 4.020 positions after base (Figure 51). Using the 1950.000 base, the timing of high will post at 1952.588 of the calendar and forwards and backwards at 3.864-year intervals. Timing of low will post at 1954.520 and forwards and backwards at 3.064-year intervals, assuming that the wave involved is symmetrical. We have no reason to think otherwise.

I have prepared an epoch chart (Figure 52), entering the sunspot timing of 1954-520 as of 20° North and South, 20° either side of the solar equator being the presumed latitude of the cycle pulse in sunspots at high and low (Wing, 1958). A passage line with the ratio of $90^\circ = \sqrt{1/2 \text{ (Wave Length)}^2}$ has been added. The timings of strength (high) for the 36 temperature stations and two ice break up sites are added also, stations of a century or longer being indicated by 0, those shorter by X. The calendar timing and other data are given in Table 1. The forty terrestrial epochs cluster about the presumed passage line in the sun as transferred bodily to the same epoch chart. Here we have yet another example of the habit of terrestrial epochs to align themselves with solar timing. It can be taken as one more indicator of the passage of cycle pulses over the respective solar and terrestrial spheres, simultaneously equatorward from the polar regions.

We can test the behavior in Figure 52 by a very simple technique. At random, the 38 epochs representing temperature have equal opportunity to fall anywhere within any 3.864 years. Should we divide the 3.864 years into two equal parts, one centered upon the passage line, and if they are randomly distributed, there should be as many epochs in the part not centered upon the passage line as in the part so centered. This can be determined by counting. Of the 38 epochs, 36 fall in the centered half of the wave length, while two (Rome and Toronto) fall in the other half. They are certainly not distributed at random. The Lemming and tree ring epochs fall in the centered half also, though they represent different things. The temperature (and ice break up) records, on the other hand, all

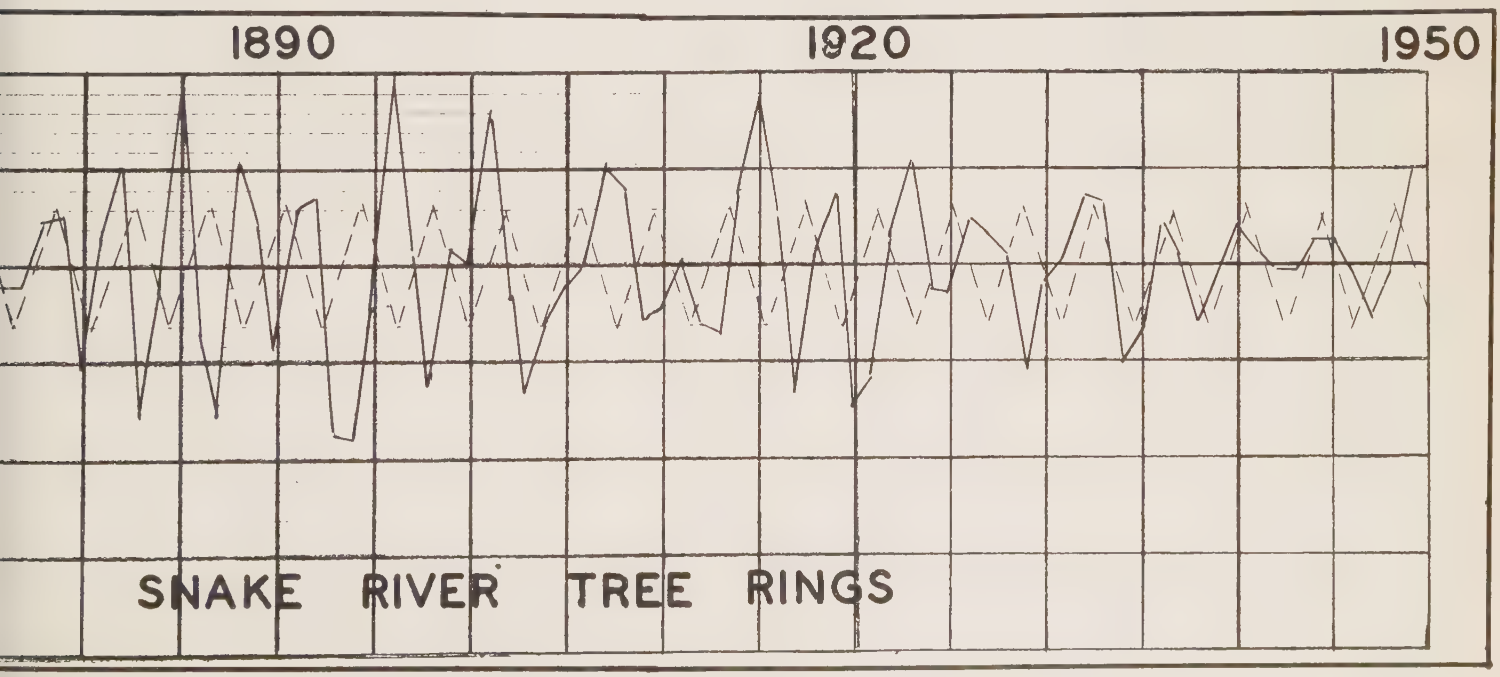


TABLE 1

Timing of Epoch in Temperature with Respect to the 3.864-Year Cycle Wave Length

(The charts illustrating the 3.864-year periodic table for each of the locations listed below follow in Figures 13—51.)

| Place | Years of Record | Geographic Latitude o | Geomagnetic Latitude o | Timing of High as of Calendar Year |
|---|---|---|---|---|
| Stykkisholm | 1846-1950 | 65.1N | 71N | 1953.250 |
| Bergen | 1816-1950 | 60.4N | 61N | 1952.418 |
| Helsinki | 1829-1950 | 60.2N | 57N | 1952.420 |
| Oslo | 1816-1950 | 59.9N | 60N | 1952.368 |
| Edinburgh | 1764-1950 | 55.9N | 59N | 1952.500 |
| Copenhagen | 1768-1950 | 55.7N | 56N | 1953.900 |
| Vilno | 1781-1950 | 54.7N | 52N | 1952.950 |
| Berlin | 1769-1950 | 52.4N | 53N | 1953.025 |
| Zwanenberg | 1743-1860 | 52.4N | 54N | 1954.050 |
| De Bilt | 1849-1950 | 52.1N | 54N | 1953.200 |
| Greenwich | 1841-1949 | 51.5N | 54N | 1953.550 |
| Frankfort | 1835-1950 | 50.1N | 51N | 1952.925 |
| Vienna | 1775-1950 | 48.2N | 48N | 1953.100 |
| Budapest | 1780-1947 | 47.3N | 46N | 1953.525 |
| Sibiu | 1851-1950 | 45.8N | 44N | 1953.775 |
| Toronto | 1841-1950 | 43.7 | 55N | 1955.182 |
| Detroit | 1840-1950 | 42.3N | 53N | 1954.310 |
| Blue Hill Observatory | 1832-1955 | 42.2N | 53N | 1954.200 |
| Rome * | 1811-1950 | 41.9N | 42N | 1952.268 |
| New Haven | 1781-1950 | 41.3N | 52N | 1954.432 |
| New York | 1822-1950 | 40.7N | 52N | 1953.450 |
| Athens | 1858-1950 | 38.0N | 36N | 1954.532 |
| Gibralter | 1852-1950 | 36.1N | 40N | 1953.960 |
| Santa Fe*** | 1849-1950 | 35.7N | 44N | 1953.194 |
| Charleston | 1823-1950 | 32.8N | 44N | 1954.575 |
| San Diego | 1850-1950 | 32.7N | 40N | 1954.700 |
| Havana | 1871-1950 | 23.1N | 34N | 1955.132 |
| Bombay | 1878-1950 | 18.9N | 9N | 1955.182 |
| Port Blair | 1867-1941 | 11.7N | 0N | 1954.575 |
| Trinidad | 1862-1940 | 10.7N | 22N | 1954.432 |
| Batavia | 1866-1945 | 6.2S | 17S | 1954.575 |
| Santiago | 1861-1950 | 33.6S | 22S | 1954.650 |
| Buenos Aires | 1856-1950 | 33.6S | 23S | 1954.332 |
| Sydney | 1859-1950 | 33.9S | 43S | 1953.300 |
| Capetown | 1857-1950 | 33.9S | 33S | 1954.932 |
| Adelaide | 1857-1950 | 34.9S | 48S | 1953.400 |
| Lake Siljan ** | 1849-1955 | 60.8N | 60N | 1953.350 |
| Lake Champlain # | 1815-1954 | 44.5N | 56N | 1954.407 |
| Lemmings ## | 1578-1949 | 64.5N | 64N | 1953.284 |
| Snake River Tree Rings ¢ | 727-1951 | 43.6N | 50N | 1954.082 (Low) |

* 1931-1940 missing; ** Winter season;
*** 1941-1950 Albuquerque data used with correction of -4.9;
# Spring season; ## Lemming year; ¢ Tree Ring year

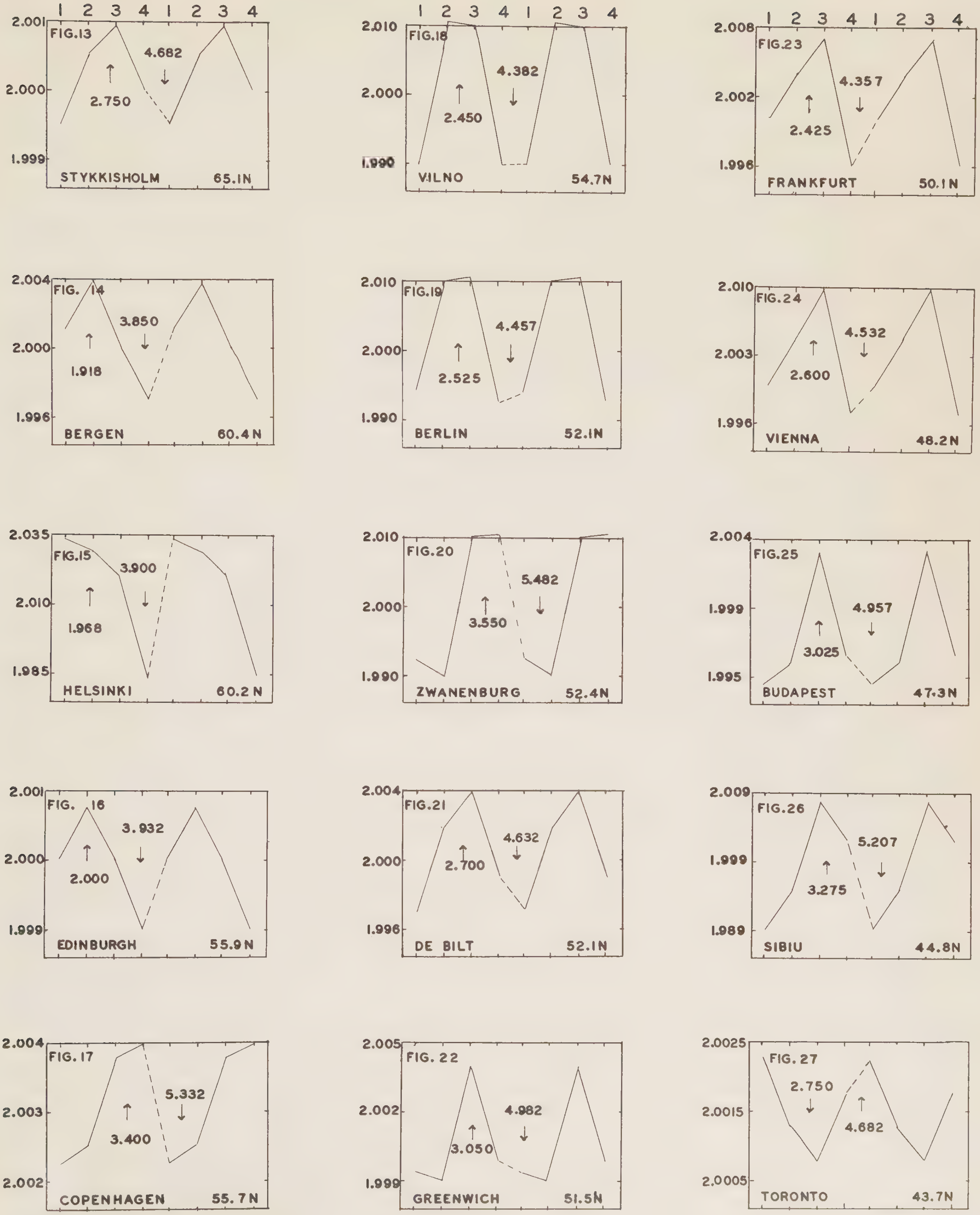



FIG. 13-27: 3.864-YEAR PERIODIC TABLES OF TEMPERATURE AT VARIOUS LOCATIONS, SHOWING TIMING OF EPOCHS.

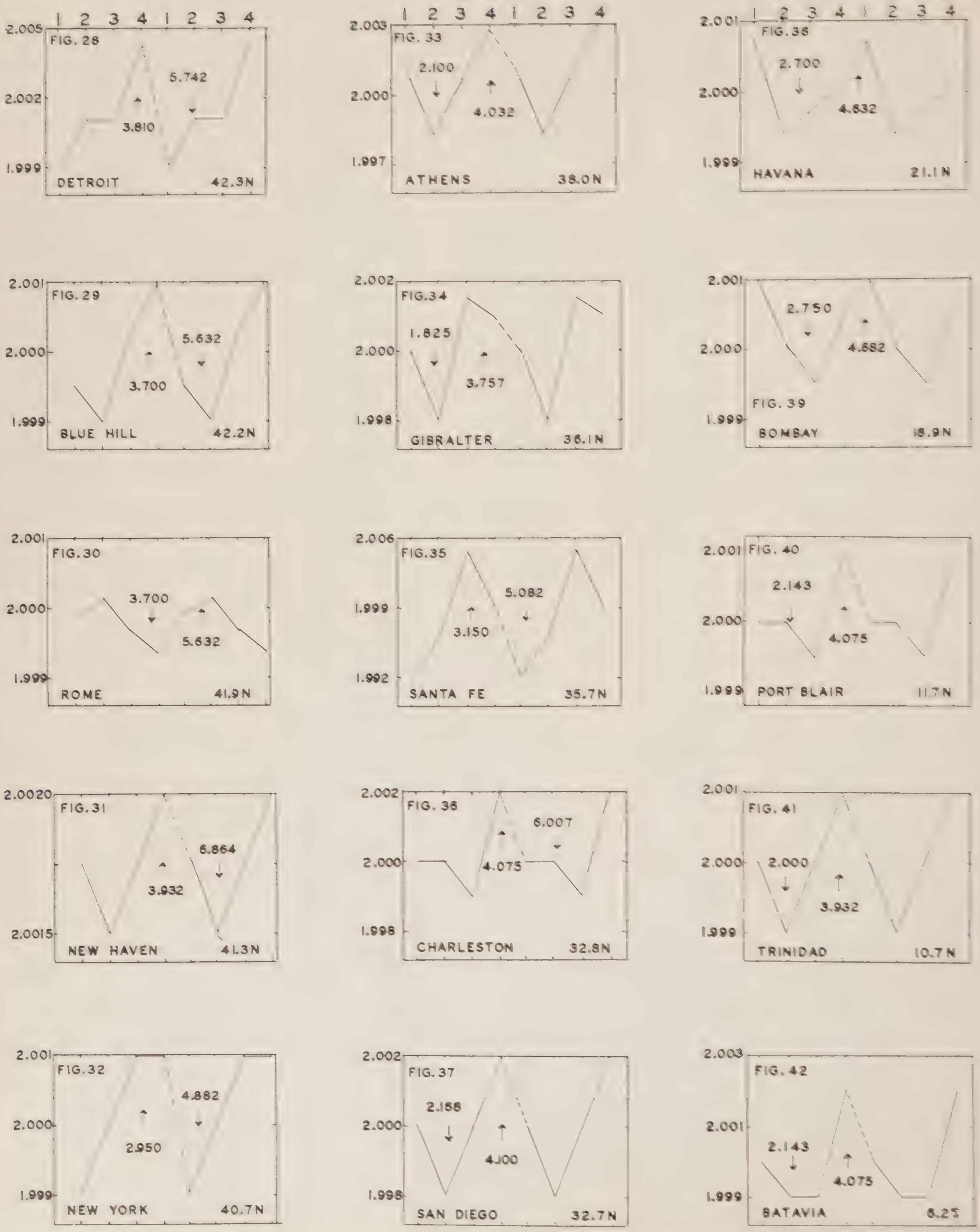



FIG. 28-42: 3.864-YEAR PERIODIC TABLES OF TEMPERATURE AT VARIOUS LOCATIONS, SHOWING TIMING OF EPOCHS.

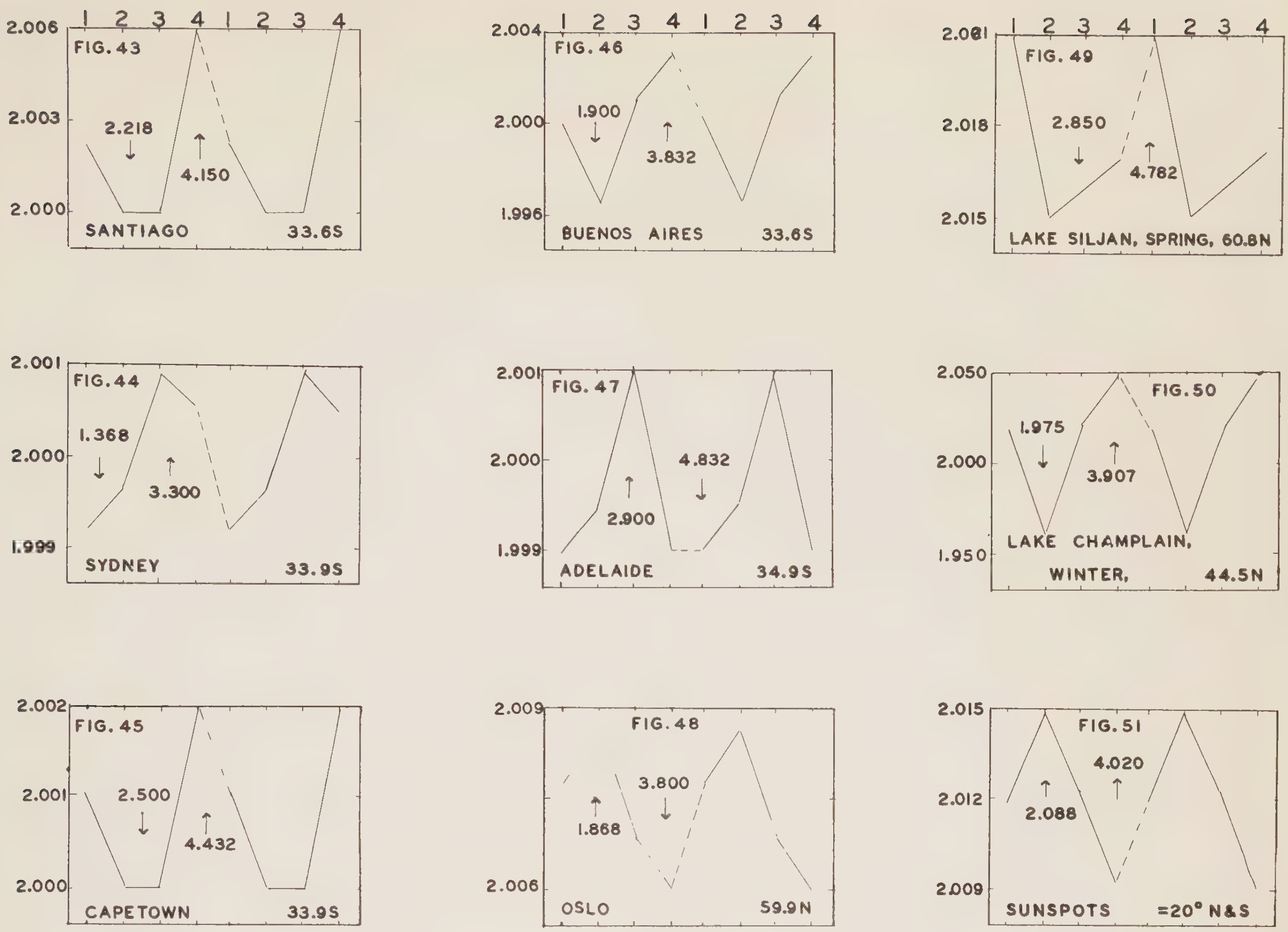



FIG. 43-51: 3.864-YEAR PERIODIC TABLES OF TEMPERATURE AT VARIOUS LOCATIONS, SHOWING TIMING OF EPOCHS.

measure the same thing.

The obvious point arises of possible relationship to geomagnetic latitude rather than to geographic latitude. It is possible to test for any association of the epochs with geomagnetic latitude and for any differences between this and association with geographic latitude. I obtained the geomagnetic latitudes of the several sites (Table 1) and prepared an epoch chart from them (Figure 53). As before, we can count the number of epochs falling within the half of the wave length centered upon the passage line in comparison with those centered in the other half. For geomagnetic latitudes, 33 fall within the centered half while 5 (Rome, Toronto, Helsinki, Lake Champlain, and Havana) fall in the other half. If it measures association, this difference seems to indicate greater association with geographic than with geomagnetic latitudes. This is in line with results of previous studies that have indicated also a greater association with geographic latitudes (Wing, 1961).

The conclusion seems inescapable that a cycle pulse of 3.864 years, unknown though its identity may be, passes over the surfaces of the earth and sun, simultaneously, equatorward from the two polar regions. Lemming numbers rise and fall with it; the thermometer goes up and down as the pulse passes. While this particular pulse is a powerful influence in the life of the Lemmings, it is rather minor in temperature. It hardly seems possible that the modest (or less) temperature change could be effective in Lemming life. Hence, it would seem as though the pulse influences Lemmings through some way other than temperature changes. The existence of this unknown and unseen cycle pulse seems established. But it raises the inevitable question of just what it may be and the means by which it operates.

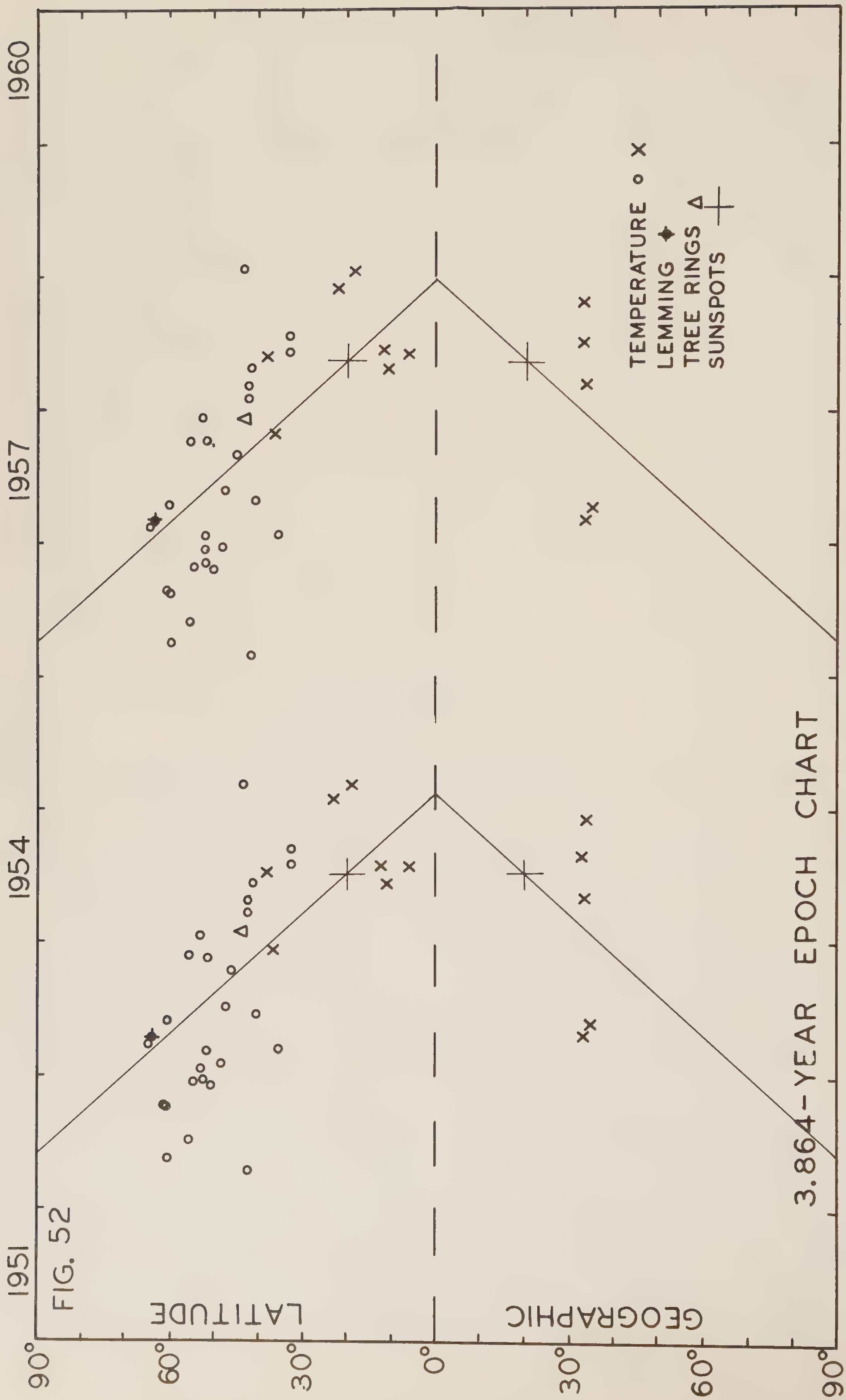



FIG. 52

3.864-YEAR EPOCH CHART

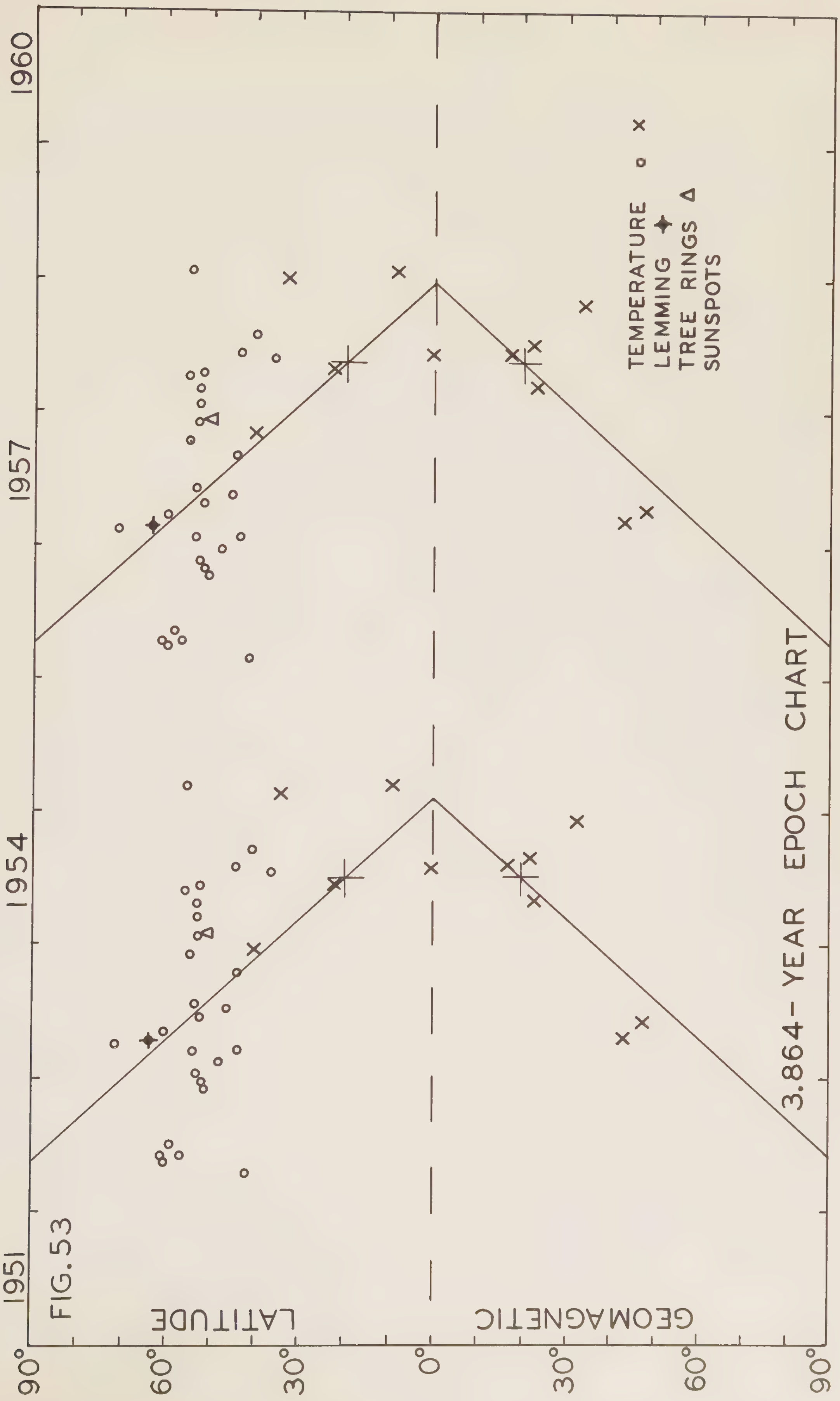

1951
1954
1957
1960
90°
60°
30°
0°
30°
60°
90°
GEOMAGNETIC
LATITUDE
TEMPERATURE
LEMMING
TREE RINGS
SUNSPOTS
3.864- YEAR EPOCH CHART

FIG. 53

## REFERENCES

DEWEY, EDWARD R., 1961, "The Sunspot Number Constant." *Journal of Cycle Research,* Vol. X: pp. 15-16.

SCHULMAN, EDMUND, 1956, *Dendroclimatic Changes in Semi-arid America.* University of Arizona Press, Tuscon.

WING, LEONARD W., 1957, "Ultra-Long Waves and Solar-Terrestrial Cycle Relationships." *Journal of Cycle Research,* Vol. VI: pp. 55-119.

________________, 1958, "Latitudinal Passage Behavior." *Journal of Cycle Research,* Vol. VII: pp. 67-78.

________________, 1961, "Latitudinal Passage, A Principle of Solar-Terrestrial Cycle Behavior." *Conference on Solar Variations, Climatic Change, and Related Geophysical Problems.* N. Y. Academy of Science (in press).

Mr. H. A. Musham
Naval Architect
741 Rush Street
Chicago 11, Illinois